

In This Issue—*Engineering for the Service Man*

# MOTOR AGE

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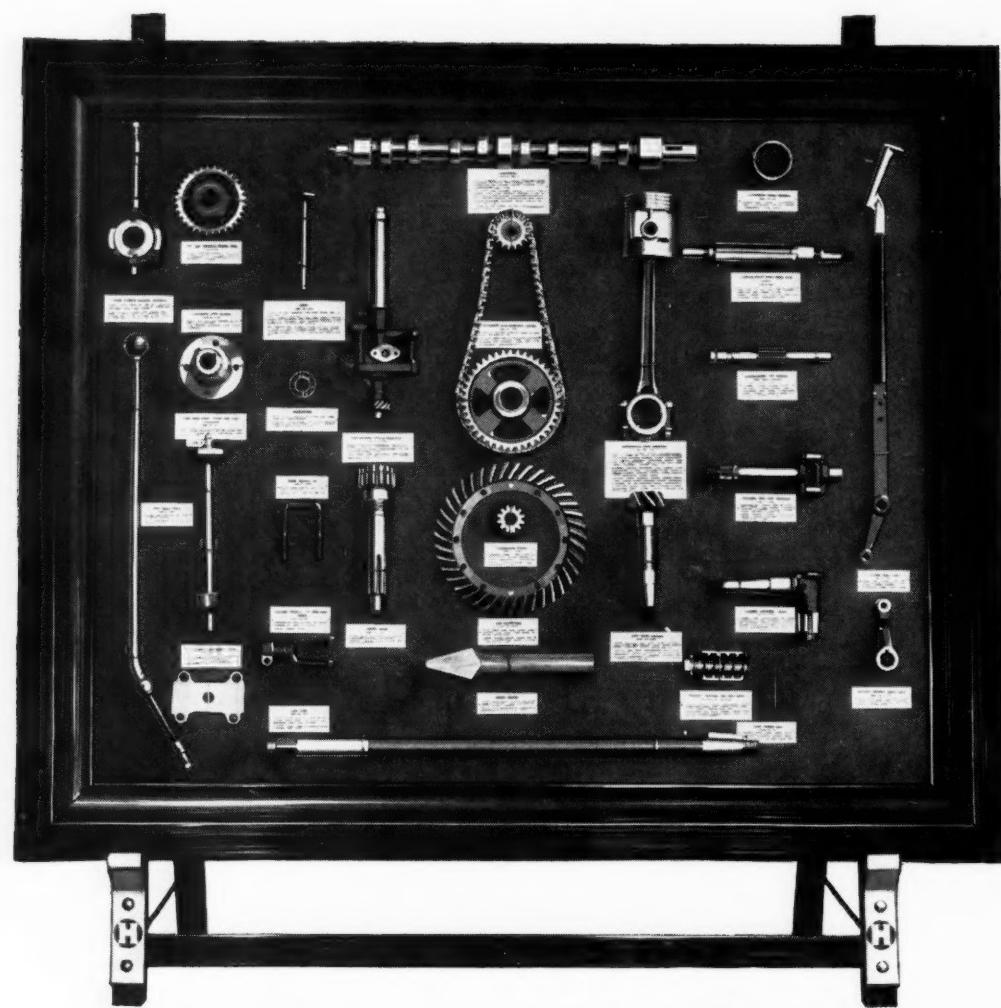
**W**HEN I was a kid they tore down the village water tower and I got a job chopping plaster off bricks at ten cents a hundred.

First it cost me 90 cents for a hatchet. Then I had to clean 900 bricks to pay my overhead. I cleaned bricks until my hands were sore and my hatchet worn out. Then I quit.

That incident always comes to my mind when I see a small dealer delivering a lot of cheap cars at a loss.

He can't even clean enough bricks to pay for his hatchet.

*Edward S. Jordan*  
President  
Jordan Motor Car Company  
Cleveland, Ohio



## Quality—and Its Proof

### *To Show Exactly How Finely the Hupmobile Is Manufactured*

The inside of a motor car is what determines the worth of the buyer's investment. Every motor car dealer, in particular, knows how true this is. Because that is so, Hupmobile dealers now present in advance, and in a new way, quality-proof to the prospect. Quality-proof pertains to Hupmobile parts. It is made up of parts you can't see in the car. It is on display in the salesrooms of practically all Hupmobile dealers—and it is helping to sell more Hupmobiles than ever before.

#### *Finer Parts Cannot Be Made*

It establishes, in the surest, most positive way in the world, that Hupmobile quality—therefore Hupmobile value—is unique and superior.

It shows the prospect clearly that parts cannot be more finely made. It shows him these things, even though he may not be an expert in motor car manufacture. And he is responding in a way that is making more money for Hupmobile dealers.

These parts—which look no different from parts of lesser quality, but actually *are* vastly different—are the heart and soul of all the good you and your customers, and every other dealer's customers, hear about the Hupmobile.

In them is bound up the long life of the car—all its virtues of low costs and few replacements, of superior performance and high running economy.

The owner may never see them throughout the years that he would own a Hupmobile. For it is a fact that hundreds and hundreds of our owners never need replace a single vital part. That, it seems to us, constitutes the highest kind of superiority.

We could use materials of lesser quality; we could manufacture them into parts at lower cost, if we chose.

But if we should do that, the Hupmobile would sink to the dead level of motor cars.

It would lose many of the elements which now enable it to give such widespread and complete owner-satisfac-

tion. So it would not profit the buyer—and it would hold less profit possibilities for the dealer.

#### *Now Easy to Decide The Motor Car Question*

The motor car question, as we see it, and as Hupmobile dealers can, with literal truth, state it to the public, comes down to this.

The buyer can pay the Hupmobile price, safe in the assurance that a higher price cannot bring him anything higher in honest value.

Or, he can pay less than the Hupmobile price, and content himself with less than Hupmobile quality and less than Hupmobile satisfaction.

That is a powerful argument. Only Hupmobile dealers can use it effectively—because the Hupmobile is the only car which backs up such a selling argument to the full.

The car that is better for the owner is better for the dealer. The Hupmobile means the most pleasant relations with customers, and a profitable business that is increasing rapidly.

# To get quality in the ring look for QUALITY on the ring

**QUALITY**  
Piston Rings



For over twelve years we have been manufacturing piston rings and for over twelve years their outstanding characteristic has been the quality which we have built into them.

Quality is more than a surface attribute—it is inherent in the product itself. It includes the proper choice and use of raw materials, accuracy in design and perfection in workmanship.

To insure your receiving in piston rings, the high standards of quality to which your purchase entitles you, we are NOW stamping the word **QUALITY** on every ring.

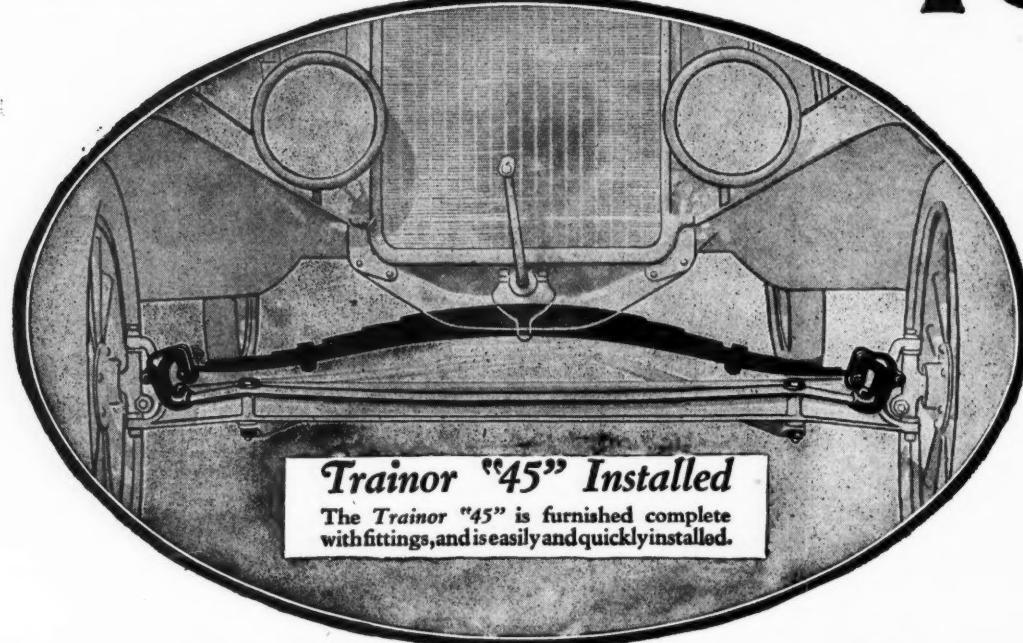
The trade name **QUALITY** was selected as the only word suitable to fully express the actual values in each ring that bears this name.



*The Piston*   
RING COMPANY

Muskegon, Michigan

# TRAINOR "45"



## Repeat Orders Prove Success!

ANY product that "repeats" in volume is a success—and a money-maker for you. The *Trainor "45"*—the 45-inch shock-absorbing Ford front spring—is setting a fast pace on repeat business.

Initial orders for the *Trainor "45"* have grown and grown until today it is a big volume seller in jobbing houses and garages all over the United States. And in foreign countries, too: A dealer in

Malmo, Sweden, first bought two dozen "45s"—and he just cabled for 200 more. Jobbers, dealers, exporters, international corporations—all are increasing their orders for the *Trainor "45"* each month.

The *Trainor "45"* is made of the highest grade alloy spring steel—*Trainor* treated—bronze bushed—and backed by the unqualified *Trainor* Guarantee of satisfaction to the user. Order from your jobber or write to us.

**EIGHT-LEAF**  
for Roadsters and Touring Cars

Price \$10.00

**NINE-LEAF**  
for Coupes and Sedans

Price \$11.25

**TEN-LEAF**  
for Trucks

Price \$12.50

*The Trainor "45" is sold only through automotive jobbers. Jobbers interested in our distributing proposition should write us at once.*



*"The Trainor Way", an improved method of handling replacement springs, is making more money for jobbers everywhere. Write for it!*

TRAINOR NATIONAL SPRING COMPANY

NEW CASTLE, INDIANA

# MOTOR AGE

Reg. U. S. Pat. Off.

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Entered as Second Class Matter Sept. 19, 1899, at the Post Office  
at Chicago, Ill., under Act of March 6, 1879.



Back of the constant advertising that is winning new patch users every day among the readers of the Saturday Evening Post and the leading farm and motor publications, is the solid fact that—

**Las-Stik makes the cheapest permanent repair.**

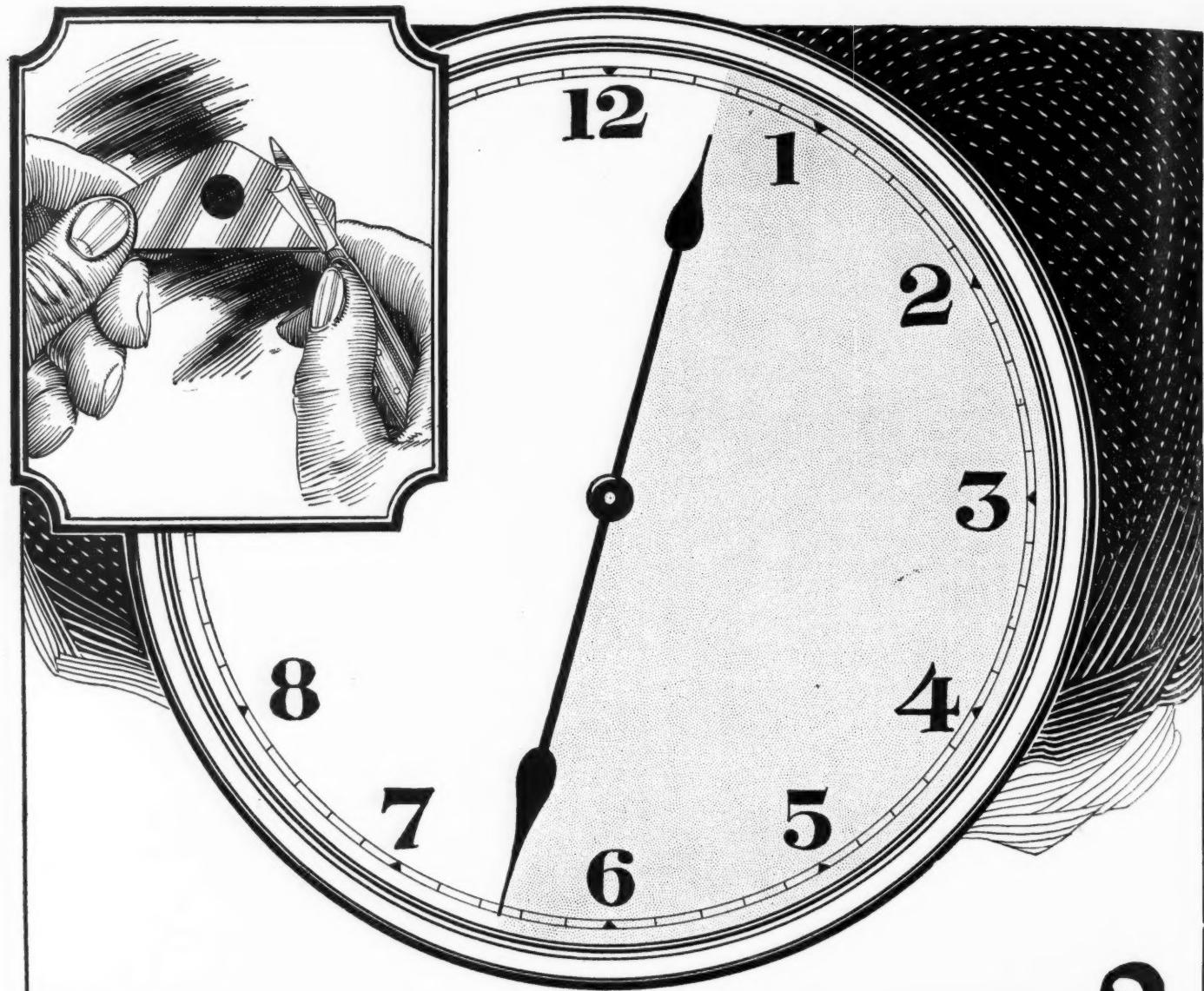
**Las-Stik makes the quickest, easiest repair.**

**Las-Stik makes permanent customers (repeat buyers), and boosters of every motorist who is won to a first trial by Las-Stik advertising.**

Dealers write for sample can and send your jobbers name. Do a real volume business on patches.

**LAS-STIK PATCH MFG. CO.  
Hamilton, Ohio**

—*Las-Stik*—  
**TUBE PATCH**



## Want to cut time in half?

You can actually save 1 to 4 hours on an adjustment job, when you use LAMINATED shims—the shims that PEEL. Time is money. Time is labor. Time is expensive. Save time and add to your profits.

With LAMINATED shims, all you have to do is PEEL off the layers of shim brass with a pocket knife and the shim is ready. Smooth, accurate, true. Get 'em from your jobber. For every make of car.

**For Every Make of Car**

**Your Jobber Sells Them**

*Address "Sales Dept."*

**LAMINATED SHIM COMPANY, Inc.**

14th St. & Governor Pl.

Long Island City, N. Y.

St. Louis: Mazura Mfg. Co.

# LAMINUM

# "Why I quit Banking to go into Business with Studebaker"

**Do you know that scores of Studebaker dealers are former bank executives who saw the rising opportunity offered in a Studebaker contract and took advantage of it?**

**O**NE of the best proofs, we believe, of the fairness and cold dollar value of a Studebaker contract is the large number of bankers now in business as Studebaker dealers.

These men saw business opportunity waiting them in the ever increasing automobile business. And they saw their greatest opportunity with Studebaker.

For one thing, Studebaker covers the whole quality car field.

Thus any prospect who can spend \$1,000 belongs to Studebaker. Building three models and thirteen body styles enables Studebaker to meet every purse requirement, every family or business requirement in a car.

Hence Studebaker is not held to any

"price class." Nor is repeat business lost by not being able to supply customers with a higher priced car. When a Studebaker customer steps up, he stays with Studebaker—of how many other makes can this be said?

Studebaker is the world's largest quality producer. Thus great manufacturing economies are effected. Studebaker offers *more for the money*.

The amazing rise of Studebaker is motordom's sensation. \$90,000,000 in assets, a complete quality line, and 72 years of honest dealing are represented in a Studebaker contract.

Do you wonder, then, that when bankers go into the automobile business, they come to Studebaker?

### LIGHT-SIX

5-Pass. 112-in. W. B. 40 H. P.	
Touring . . . . .	\$1045
Roadster (3-Pass.) . . . . .	1025
Coupe-Roadster (2-Pass.) . . . . .	1195
Coupe (5-Pass.) . . . . .	1395
Sedan . . . . .	1485

### SPECIAL-SIX

5-Pass. 119-in. W. B. 50 H. P.	
Touring . . . . .	\$1425
Roadster (2-Pass.) . . . . .	1400
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Sedan . . . . .	1985

### BIG-SIX

7-Pass. 126-in. W. B. 60 H. P.	
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Speedster (5-Pass.) . . . . .	1835
Coupe (5-Pass.) . . . . .	2495
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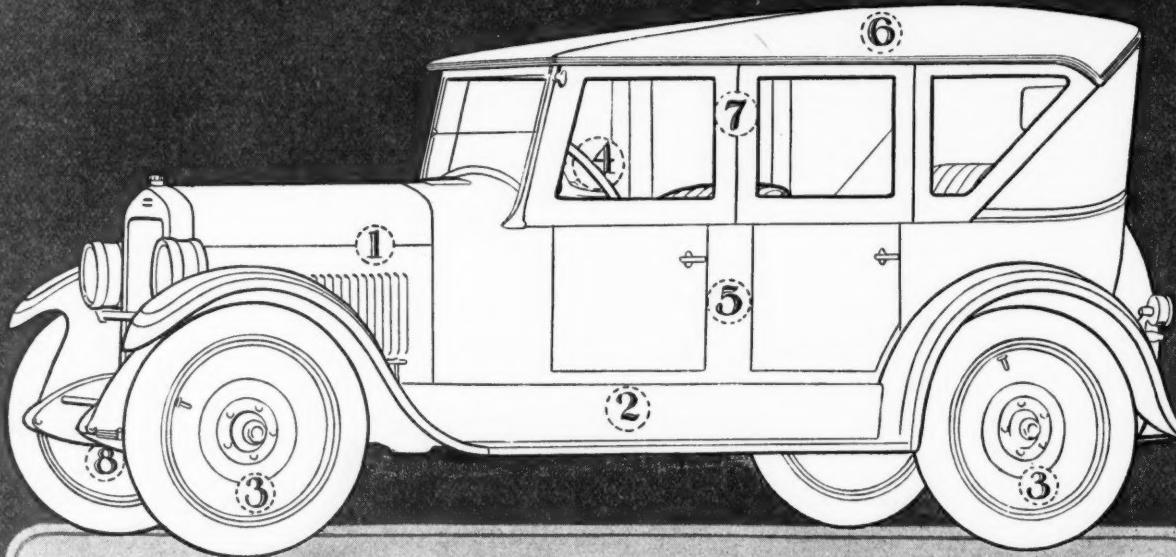
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**THE STUDEBAKER CORPORATION OF AMERICA**

SOUTH BEND, INDIANA

**THE WORLD'S LARGEST PRODUCER OF QUALITY AUTOMOBILES**

# Here are Eight Oakland Features that other Cars will have *Next Year*



**1** Automotive engineers acknowledge that the advanced features of Oakland's new six-cylinder L-head engine have set a higher standard for light-six power, smoothness and durability.

**2** Oakland's chassis incorporates the latest and best. The rugged frame, silent rear axle, easily operated clutch and transmission, make a perfectly balanced light-six.

**3** Oakland is the only light-six having four-wheel brakes as a standard equipment. Sell a car with four-wheel brakes now—don't wait until next year for this big sales advantage.

**4** Centralized controls on the steering wheel are so convenient, Oakland owners wouldn't do without them. This is a big and exclusive Oakland sales feature.

**5** Oakland's new Duco body finish looks better and lasts indefinitely. Next year many cars will have it but Oakland has it right now.

**6** Oakland's permanent top looks neater and lasts longer. It will be on all other cars some day. It is helping Oakland sales right now.

**7** Oakland's comfortable glass enclosures are available on all True Blue Oakland open cars. They give closed-car protection and are a unique Oakland feature.

**8** Disc wheels are safer, better looking and more desirable. Most car builders admit they are superior by charging extra for them. They are standard on all Oaklands.

When you choose a line of cars to sell, you certainly want the latest and best. That is why it will pay you to know all about the True Blue Oakland before you make any decision.

OAKLAND MOTOR CAR CO., PONTIAC, MICH.

Roadster - - -	\$ 995
Touring Car - - -	995
Sport Touring - - -	1095
Sport Roadster - - -	1095
Business Coupe - - -	1195

Coupe for Four \$ 1395  
Sedan - - - 1445

Glass Enclosures for Touring  
Cars \$60—for Roadsters \$40.  
All prices f. o. b. factory

Oakland

True Blue Touring Car  \$ 995<sup>00</sup>



# MARMON'S Twelve Strongest Competitors

**The Twentieth Century Limited**  
New York Central Lines

**The Broadway Limited**  
Pennsylvania R. R. System

**The California Limited**  
Santa Fe Railroad

**The Sunset Limited**  
Southern Pacific

**The Oriental Limited**  
Burlington and Great Northern

**The Olympian**  
Chicago, Milwaukee & St. Paul

**The Texas Special**  
Missouri, Kansas & Texas

**The Overland Limited**  
Northwestern-Union Pacific

**The Sunshine Special**  
Missouri Pacific

**The Royal Palm**  
Big Four and Southern

**The Capitol Limited**  
Baltimore & Ohio

**The Golden State Limited**  
Rock Island Railroad

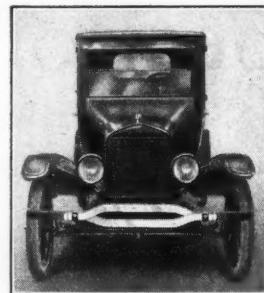
"Shall we go in the MARMON  
or take the train?"—a logical question  
seriously asked and hard to decide.

NORDYKE & MARMON COMPANY • Established 1851 • INDIANAPOLIS

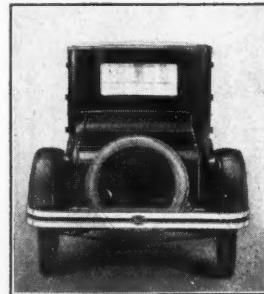


# The Light Car Market for **WEED BUMPERS**

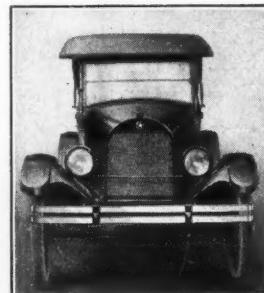
## You Can't Afford to Overlook it!



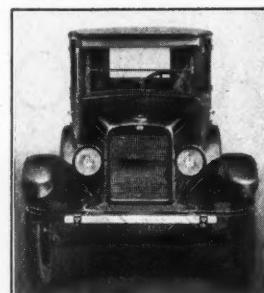
Ford car with  
"Safety Light  
Car" Bumper



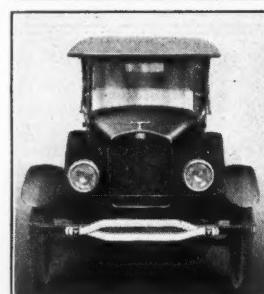
Chevrolet car  
with "Sentry  
Model D"  
Bumper



Star car with  
"Security"  
Bumper



Overland car  
with "Hoover  
Twinbar"  
Bumper



Gray car with  
"Safety Light  
Car" Bumper

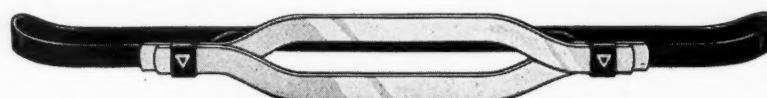
**L**IIGHT cars outnumber all other makes, 4 to 1. Recognizing this fact, we will soon advertise WEED "Safety Light Car" and "Security" Bumpers in the big national circulating magazines.

No matter where you are located, you are where the light car owners ride and buy—because they are everywhere. Don't overlook the opportunity of increasing your sales and at the same time rendering the car owners a distinct service by selling them WEED Bumpers.

### AMERICAN CHAIN COMPANY, INC. BRIDGEPORT, CONNECTICUT

In Canada:  
DOMINION CHAIN COMPANY, LIMITED, Niagara Falls, Ont.

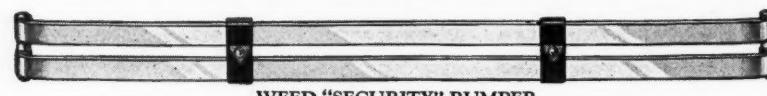
District Sales Offices:  
Boston, Chicago, New York, Philadelphia, Pittsburgh, San Francisco  
WORLD'S LARGEST MANUFACTURERS OF  
WELDED AND WELDLESS CHAINS FOR ALL PURPOSES



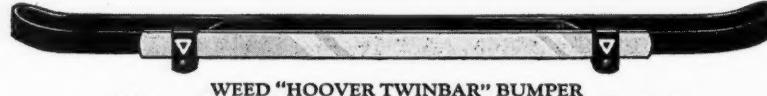
WEED "SAFETY LIGHT CAR" BUMPER  
1½-inch—List Price Complete, for Chevrolet, Ford, Gray, Overland  
and Star Only—Black, \$14.00; Nickel, \$15.00



WEED "SENTRY, MODEL D" BUMPER  
1½-inch—List Price Complete, for Light Cars—Black, \$16.50; Nickel, \$17.00

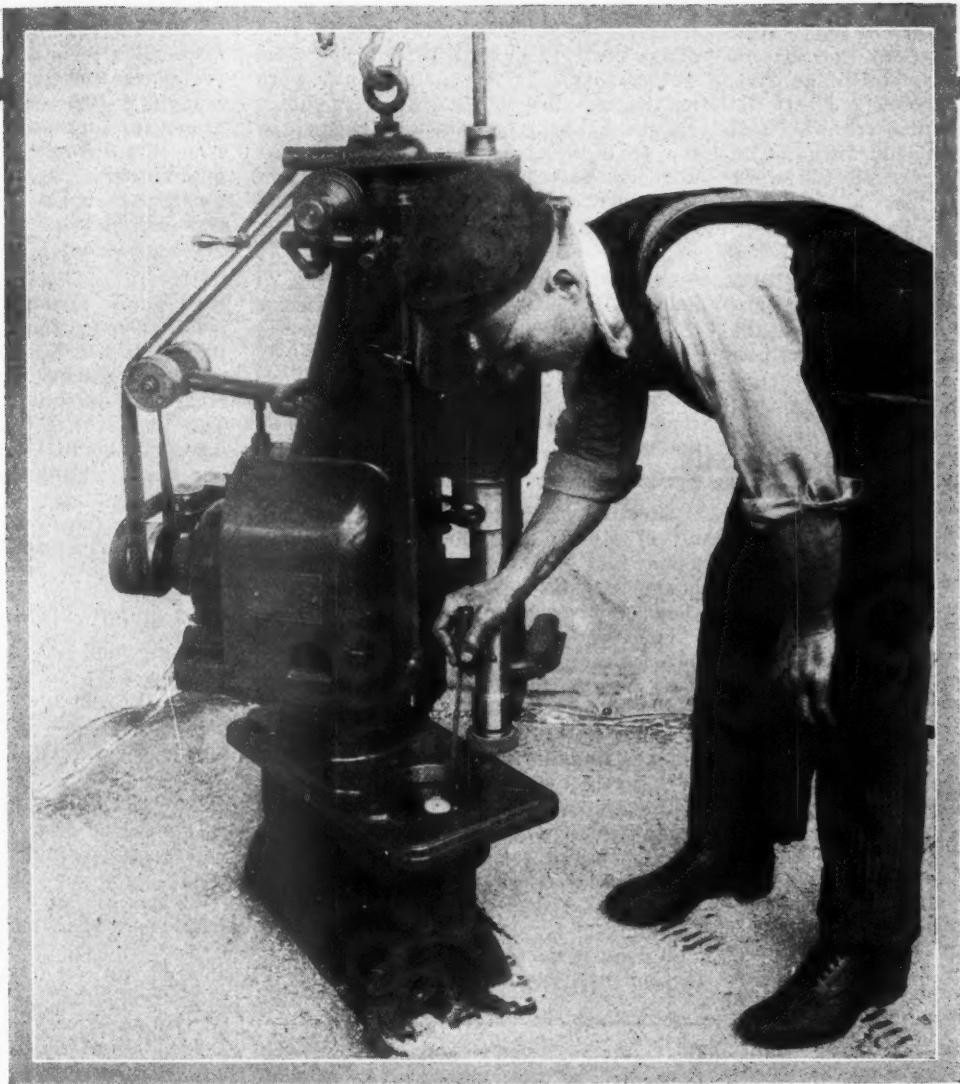


WEED "SECURITY" BUMPER  
1½-inch—List Price Complete, for Chevrolet, Ford, Gray, Overland  
and Star Only—Nickel, \$12.50



WEED "HOOVER TWINBAR" BUMPER  
1½-inch—List Price Complete, for Chevrolet, Ford, Gray, Overland  
and Star Only—Black, \$11.00; Nickel, \$12.00

# MOTOR AGE



## Men—Machinery—Methods

OF late there has been much agitation in the maintenance end of the automotive industry as to the logical organization for the work of engine reconditioning.

Briefly we do not think that this work will eventually be done by any certain type of institution. We do not believe that service and maintenance is going to be entirely eliminated as a distinct feature of the automotive dealer's business.

Neither do we believe that the jobs of rebuilding engines is going to be relegated to the specialty shops

which are tooled up completely to handle all classes of work.

We do believe that the shop, whether conducted by the dealer or anyone else, that gets the right kind of men, and pays them well, installs honest-to-goodness equipment and sells its work according to good business ethics is going to always get its share of the business. To the automotive shop is certain of its reward in getting this business of reconditioning engines. But the three M's, Men, Machinery and Methods, are necessary.

# How Much Work Should Be "Farmed Out"

*Better to Have Work Well Done in Another Shop Than to Slur It in Your Own. There Must Be Sufficient Use for Equipment or It Cannot Be Profitably Retained*

By B. M. IKERT

HERE is a belief on the part of many in the automotive industry, especially those connected with the maintenance of automotive vehicles, that, due to the lack of efficient workmen in service stations and garages, the work of reconditioning engines is going to shops which specialize in this class of work.

We find that concerns engaged in cylinder grinding are more and more putting themselves on a basis whereby they can completely overhaul or recondition an engine.

There are on record dealer service stations which farm out much of their work to highly specialized shops—shops equipped with crankshaft grinders, cylinder grinders and other machine tools, usually too costly for the average shop.

The cylinder regrinding concerns say they have little or no control over their work when an engine for which they have reground the cylinders and fitted new pistons is assembled in another shop.

The shops equipped to do all manner of grinding and reconditioning engine parts say the small shop or the shop of the dealer operating in a small town is money ahead by sending their work to the larger and better equipped shop.

To this we find many who say that the small shop, especially the shop operating in a neighborhood where there is a large volume of business, can be self-sustaining if it will install the necessary equipment to do complete reconditioning work. It will easily be seen that a large amount of money can be lost by the shop through dead storage. That is, if the dealer, service station or garage is holding several cars in the shop on which parts have been sent away for reconditioning money is lost because the space that these cars require might better be used for "live storage."

## People Want Prompt Service

Most people want prompt service and this holds true of maintenance work. If the proprietor of a shop can tell a customer that his work can be handled without delay right in his shop, the customer naturally is going to feel much better about it than would be the case if some of the work had to be farmed out to another town perhaps with no definite assurance when it would be returned.

Dealers who have long been connected with the industry strongly favor the idea

of the dealer who sells a man a car, also selling that man the maintenance work on the car. The general belief is that a customer thus satisfactorily treated by the dealer's service organization means a repeat sale later on of another car. Primarily, of course, a dealer is in business to sell cars and there is everything to be gained from putting the service and maintenance end of the business on a basis to insure car sales.

You will find some dealers who say that eventually sales and service will be more or less divorced. They state that service work is not profitable, that they render it because they feel certain obligations to their customers, and because

**MOTOR AGE** does not entirely indorse all of Merry's arguments. Merry suggests that one lathe and some other heavy machines serve the maintenance shops of his community.

There is some sound argument in what he says and it is necessary that there must be sufficient use for equipment or it cannot be profitably retained. So until a dealer has sufficient cars out or a sufficient volume of maintenance trade, it is perhaps better to send such work to a well equipped shop than to load his overhead with little used equipment.

We hope to see the day when most shops will have a sufficient volume of business that they can afford equipment. Certainly it is better to have the work well done in another shop than to slur it in your own shop.

The factory insists upon it. Many of them are of the opinion that if they could maintain some form of light service work, whereby the customers' cars would be kept running under the best conditions, more would be gained if the more important jobs of repairing were left to a shop specially tooled up and manned to handle such work.

Maintenance work on automotive vehicles means the installation of parts in a great many cases and this naturally is an item that must be considered when we come to debating the question of how much work should be farmed out. Why should a dealer merely stock parts and sell to the customer or to some outside shop? Should he not go a step further and get the job of installing these parts as well?

One even finds dealers who say it

might be a wise plan to not even handle the parts for the car they sell. Their thought is that we might have some sort of central source of distribution of parts from which source all shops and garages might draw. These parts might include those made by the recognized makers of replacement parts, of which there are many excellent concerns at the present time.

In many instances we find that the cylinder regrinders who have turned to the work of reconditioning engines have become the parts distributors for many makers of pistons, pins, bushings, etc. This means that they are in position to equip an engine with new parts when necessary, and parts for engines such as Cadillac, Dodge Brothers, Studebaker, and so on, they get from the authorized dealers representing those makes of cars in that vicinity.

## Men and Equipment Necessary

In the final analysis as to who should do this work of reconditioning engines it can be said that anyone who has the men and equipment is in line for it. It makes no difference who it is, dealer, service station, garage, cylinder regrinder or machine shop.

Having the men does not merely mean a large number of men. The job of reconditioning an engine involves more than merely machining the block, pistons, rings, crankshaft, and so on. There must be the right kind of men who can "button up" the jobs and tune them afterward. That is, a machinist might be the finest fellow in the world to do a good job of regrinding a block, fitting new pistons and truing up the crankshaft journals, but if he knows nothing about the theory of engine lubrication, valve adjustment, carburetor setting ignition timing, the chances are ten to one the job is going to be bungled somewhere.

The argument of late has been that the so-called service station of the dealer, the garage and shop in general has not had the right kind of equipment with which to recondition engines. Every shop cannot afford an expensive grinder, a piston grinding machine or a crankshaft grinder and in the past many jobs of "overhauling" an engine have in reality been only superficial in that only new parts such as rings and pistons have been installed without first resurfacing the cylinder bores.

All told, it looks as though the regrinder who puts in men who can work well on all makes of engines, so far as their assembly and tuning is concerned, is in line for getting much of the engine work. But by the same token, the dealer's shop or service station which puts in machine tools can do the same thing and, thereby, keep their entire service and repair work under one roof. It is being done in hundreds of dealer shops today and no doubt will become more common as time goes. The last statement is based on the activities of machine tool makers who are putting machines on the market for these shops at a nominal price. In the past the machine tool makers have largely overlooked the possibilities of a suitable garage tool and have based their output mostly on the heavy production concerns.

To give some idea as to what can be done in the way of specialized service and set a mark for others to shoot at we cite here the things done by a concern in Rochester, N. Y., which is conducted by A. F. Merry & Son. A sign bearing the words "Motor Specialists" hangs over the door of this institution and ordinarily one would say there is nothing very startling about these words because the motoring public is more or less used to seeing all manner of "Expert Repairing," "Runwell Experts," "Ignition Experts," etc.

The word "expert" has been broadcasted all over the country from the pretentious four-story sales and service building in the large city to the modest establishment of the so-called alley rat.

Frequently when one locates one of these establishments wherein the words "expert" and "specialists" are promiscuously used, disappointment follows. The men we thought were experts prove to be otherwise and the specialists often turns out to be more of a novice. It is therefore, a real surprise to find a condition existing where the words "specialist" and "expert" are lived up to.

#### *Sign Is Justified*

A day spent with A. F. Merry & Son convinces one that the sign "Motor Specialist" is justified in this case. Briefly, the reason why this company is successful is because everything is done to a plan. Arthur Merry who manages the place has a background of experience on which the business was organized, that is seldom encountered in the automotive repair and maintenance field.

His 13 years with the General Electric Company, where he was in charge of tool and die work, together with several years of apprenticeship in the best known New England shops, making precision machine tools, have given him a foundation upon which to build an efficiently conducted and well-equipped automotive shop, specializing in engine work.

The shop of a A. F. Merry & Son is so well equipped with machine tools that most of the maintenance department and service departments of automotive dealers in Rochester and surrounding terri-

lectively these lathes will not do as much work, over a period of one year, as might be done by three such lathes in one shop. It is this duplication of machine tools which Merry's plan seeks to avoid.

The thought is to confine to the service stations only the operations which can be quickly and economically performed by men who are mechanics but not necessarily machinists and metal workers. This would leave the major operations such as engine rebuilding, to a shop that was completely tooled up to do the work accurately and with a shop personnel trained in this class of work.

#### *Flat Rate Prices Easy*

The work could be put on a production basis and the establishing of flat rate prices for the work would be an easy matter. The fact that Merry's shop now works on a 99 per cent flat rate basis, is an indication that this would hold true.

Naturally this might bring up the point of a dealer taking care of his customers by doing all the necessary repair and maintenance work under his own roof. The point is probably well figured and we grant the dealer who sells a car is the logical man to see to it that the customer gets transportation out of that car in the most economical manner.

As pointed out before, there is this condition existing. A great many of the major operations involved in engine repair and overhaul work such as cylinder regrinding, crankshaft grinding, piston and ring work, are "farmed out" to shops making a specialty of this class of work.

In the larger cities, of course, some of the dealer shops may be equipped to handle this class of work, but in the smaller community a shop with the equipment such as listed on these pages is practically out of the question, owing to the prohibitive cost of the machinery, that is, if there were 12 dealers in a town certainly all 12 would not consider it practical to tool up as completely as this individually.

Going back to the question of each dealer doing his owner service work on all the cars that he sells in his community, such a dealer under the centralized shop idea might still give his customers proper service facilities because we believe that it matters very little to the customer as to who does the regrinding job on his cylinder block just so long as he gets a good job and the dealer turns the car over to him with the assurance that the work has been properly done.

It might be likened to the case of the tailor who makes a suit of clothes but has the actual sewing of the garment done at an establishment having facilities for doing the work quickly. The customer talks it over with his tailor and so far as he knows the tailor might have done all of the work.

The centralized shop idea still allows of profit on maintenance and repairs for the dealer because of an agreement which might be made between the cen-

## List of Equipment in the Shop of A. F. Merry & Son

- 2—No. 60 Heald Cylinder Grinders, each individual motor driven.
- 1—Lodge & Shipley 14 in. by 8 ft. lathe with all tool room attachments, draw in collets and taper attachments, etc.
- 1—Pratt & Whitney 6 in. by 32 in. cylindrical grinder.
- 1—Reed 19 in. by 6 ft. lathe.
- 1—United States sensitive drill press.
- 1—McQuay Norris electric score filling machine.
- 1—Tool and cutting grinder.
- 1—Landis crankshaft grinder.
- 1—Van Norman Relio grinder.
- Auto Hone, large and small size.
- Midwest Burnishing tool.
- Reamers for every size wrist pin, found in automobile engines.
- Black & Decker  $\frac{3}{8}$  in. electric drill.
- Lyon metal cabinets and tool cupboards. A complete line of inside and outside micrometers, dial cylinder gages, piston aligning fixtures, etc.

tory send their work to this shop. "Better send it over to Merry," is the common expression in the service departments of dealers.

When you check up the equipment in Merry's shop and observe the class of work executed, you can understand why this expression exists. It is safe to say there is not a shop, automotively speaking, in Rochester that could afford to put in the equipment of A. F. Merry & Son. The list of machine tools and hand tools listed on these pages readily will convince the reader of the completeness of this shop.

This shop is almost on a 100 per cent flat rate basis, made possible, chiefly, by the efficient methods of handling the work and the completeness of the equipment. Naturally this is of vast benefit to the automotive dealer shops in that they can quote flat prices to their customers, because they always know what Merry's charge will be.

Among the major operations performed in this shop is that of cylinder grinding, cylinder honing, crankshaft grinding, fitting of pistons, wrist pins, wrist pin bushings, installing flywheel ring gears, etc. The shop does all manner of machine work and complete engine rebuilding.

Arthur Merry has in mind a plan of operation which, viewed from various angles, has considerable merit to it, and which is in line with an article published sometime ago in Motor Age dealing with a centralized repair shop catering to the needs of service departments of automotive dealers in one community.

Briefly the plan is to cut down overhead in the dealer's service maintenance shop by eliminating expensive machinery which also calls for experienced operators. For example, it does not seem good business to have a dozen service and maintenance stations install a dozen lathes, one in each place, when col-

tralized shop and the dealer. The service salesman of the dealer would then quote the customer a flat price on a job which price would naturally include the charge of the centralized shop actually doing the work.

It is Merry's belief that, owing to volume and the fact that the work could be put on a production basis, the cost for any operation could be materially reduced from the cost at which a dealer can do the operation himself, which would have the effect of either reducing the cost of the particular job to the customer or making for a larger profit.

#### *Specializes on Engines Only*

At the present time the shop of A. F. Merry & Son specializes on engines only. Merry says that their greatest difficulty is with the work, is done on an engine, which his own shop has but partially completed. That is, little is gained when a shop like Merry's does a good job of cylinder regrinding, fitting new pistons and rings only to have this spoiled by an unskilled mechanic who assembles the engine in a poor manner and later on when the owner of the car complains, blames it on to a poor regrinding job.

Merry states that the most successful jobs are those in which the entire engine is turned over to his shop for rebuilding.

This allows his own men to do all the work on the cylinders, pistons, crank-shaft, hand shaft, valves, and in fact, every unit of the engine. Then when the engine is re-assembled and properly tested in his own shop, he feels safe in turning it over to the customer or dealer who has sent the job to him. In this way he has control over all the work going in on the job.

Today a man seeks uninterrupted use of his car. He does not look with favor upon having his car laid up for a considerable length of time in a dealer's service station. Along this line Merry advances the thought that the dealer might find it advantageous to install a "rental" engine in a customer's car when the regular engine of such a car is overhauled which process may require several days.

The mechanics in the dealer's shop in this case would do the work of switching the engine and the engine to be overhauled would be sent to the centralized shop by means of a service car, such a car to be operated either by the dealer or the centralized shop.

Coming to the physical characteristics of the shop of A. F. Merry & Son, we believe we are safe in saying that it is one of the best which has come to our attention. Merry's experience with machine tool makers and with The General

Electric Company has been used to advantage in the layout of his shop and the manner of operating it.

He himself does no work in the shop, his time is taken in the handling of customers, selling the work and seeing to it that the shop functions. Being an expert mechanic he knows how to shoot trouble and how to apply the remedy. He does not tell a customer that the price might be so much but states definitely what the job calls for and what it will cost.

#### *A Lesson in Cleanliness*

Many a shop can take a lesson in cleanliness from Merry's place. The shop reminds one of an experimental laboratory, rather than a commercial shop. The working conditions are excellent and there is an abundance of light, made possible chiefly by a large skylight extending practically the length of the building.

The machine tools are excellently arranged and while they are quite closely placed together there is ample room for the operator of each to do his work. The Heald grinders are individually driven by electric motors and a third motor takes care of the line shafting for the other machines. This makes it possible to operate either grinder independently of the other machines.

## House-to-House Canvass Tried by N. C. Dealer

THE house-to-house canvass for prospective automobile buyers is not a new venture in the automobile field. Yet, it is always interesting to note the results some progressive dealer achieves with this method of selling, and especially so when those results are as excellent as they were in the case of the D. & S. Motor Co., 316 South Blount street, Raleigh, N. C., Durant and Star dealers in that section of the Carolinas.

The latter part of February this company put on a limited selling campaign to last for a single week, the principal quest for prospects being made on a house-to-house canvas, during which nearly every house in the city of Raleigh was visited by a representative of the company.

Previously the company had set aside a certain allotment of cars that it wanted to sell during this campaign, and so good were the results that every one of the cars was sold.

It has therefore become necessary, according to A. B. Hollowell, secretary of the company, to increase the firm's allotment for spring use by 100 Durant and Star cars.

Evidently house-to-house solicitation of prospects is a venture worth the time and attention of any dealer when it achieves this sort of results.

#### *New Price Tables*

A new feature of great usefulness to all automobile dealers, salesmen and the trade in general is inaugurated this week in the MOTOR AGE specifications pages.

This is a tabulated list of name, price, passenger capacity and weight of each model of all the American makes of passenger cars. In these tables MOTOR AGE presents for the first time in any publication a complete catalog of what the American market affords in passenger automobiles.

The tables are arranged alphabetically by make of cars. This arrangement makes comparisons easy.

A notable and most useful feature is the giving of the official designation bestowed upon the various models by their manufacturers, such as brougham, tourster, sport sedan and the like.

These tables are in addition to the complete mechanical specifications which will be continued and enlarged as ways are found to make them more useful to MOTOR AGE readers. The price tables will be published every week and corrected as occasion requires.

#### *Turn to Them Now*

Page 53

## Boys Learn to Care for Cars

THE McCormick Motor Co., of Birmingham, Ala., is doing some excellent long time advertising by presenting a Nash six-cylinder motor to the public schools of Birmingham, to be used in connection with the manual training work in the eighth grade. The impressions that one gains while he is yet a child are those that last longest always and the McCormick Motor Co. is not far wrong in estimating that they can trace many Nash sales to the school class motor in the years to come.

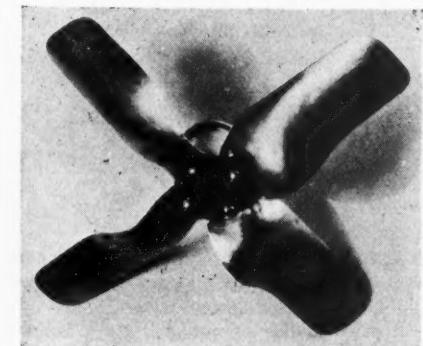
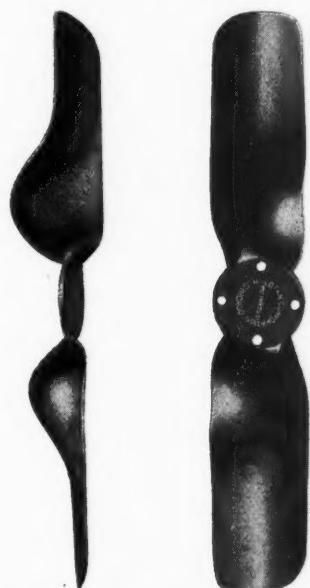
The motor will be taken apart, examined, assembled, tuned up and run by the boys in the various schools. This course in automobile engine work is one unit of a group of short, practical courses covering the most common mechanics of a modern home. The other courses include practical electrical work, concrete and cement work, plumbing repairs and any number of things calculated to make the boy useful.

It is the plan of the manual training department to set this motor up in every school in the district for a period of several days, so that each class will have a chance to learn all about its "innards" before it is passed on to the next school. During the course of instruction the following things will be shown: grinding of valves, setting of tappets and rods, timing of ignition, cleaning up plugs, adjustment of carburetor. Finally, the engine will be hooked up to a tub of water for a radiator so water circulation may be shown and run.

## Some New Things Automotive

### Maximum Air Thrust Feature of Hi-Lo Fan

In order to displace the maximum amount of cubic air per revolution the Hi-Lo fan incorporates a design quite unlike that in the conventional form of fan. Due to the peculiar shape of the blades it is stated that this fan delivers an air thrust three times as great as

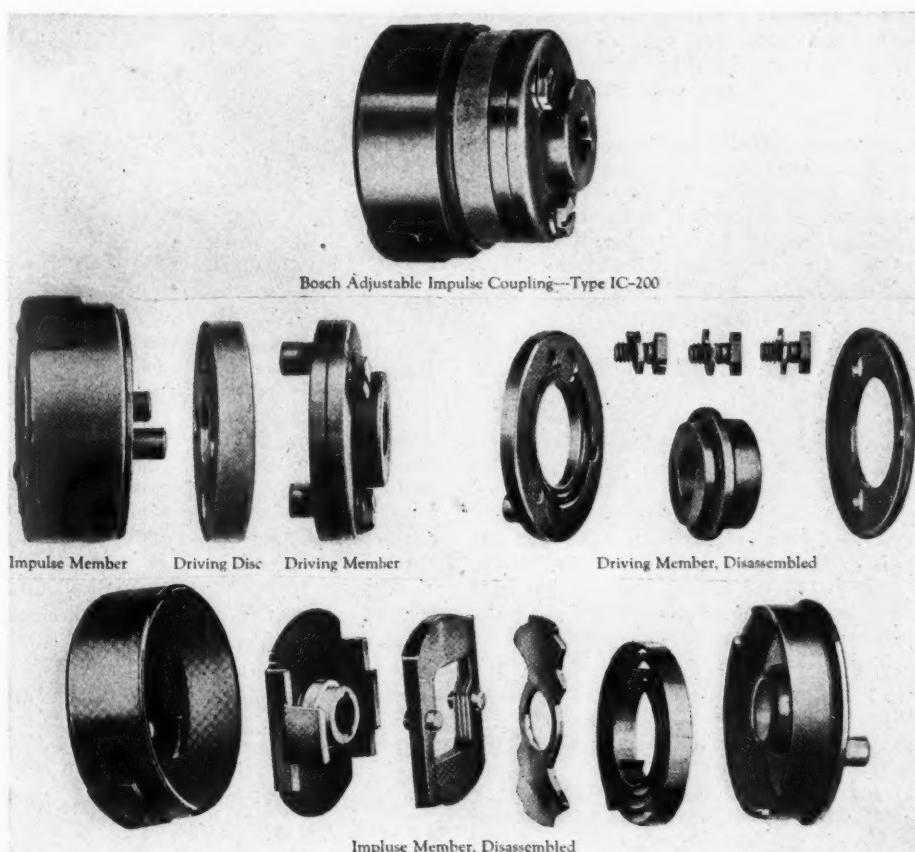


*Two views of the Hi-Lo fan, showing the peculiar shape of the blades to get maximum air thrust*

that from a fan of the flat blade type. This is due to the fact that the Hi-Lo fan utilizes the full length of its blades. This type of blade is said to increase its air thrust as the number of revolutions per minute are increased, resulting in no collapse point of air thrust. Hi-Lo fan blades were originally designed as airplane propeller blades and from the knowledge gained they were modified to meet automobile engine cooling conditions.

Thus far the company has concentrated on the production for Hi-Lo fans for Fords. The set consists of a pair of blades and in installing them it is only

### Another New Product Announced by Bosch



THE American Bosch Magneto Corp., Springfield, Mass., has just announced a new adjustable impulse coupling for use with Bosch High Tension Magnets. It contains improvements in design and construction that make it highly efficient and remarkably dependable.

The purpose of this new Bosch impulse coupling, which is known as Type IC-200, is to facilitate starting of heavy duty gas engines on trucks, tractors and motorboats without the aid of an auxiliary battery system. The coupling is a spring device of simple construction. The entire device is enclosed by a steel housing which makes it dustproof and indestructible.

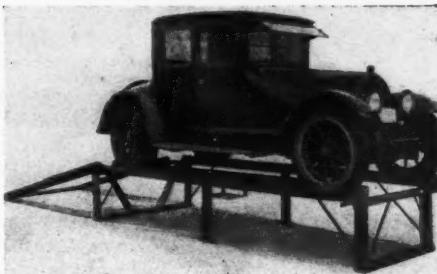
necessary to remove the fan blades on the car and replace them with the Hi-Lo blades, the holes being spaced to conform with the holes in the Ford fan hub. The blades are finished in black and carefully balanced before shipment. This is an important matter, because very often in service work an undue noise at the front of the car has been traced to unbalanced fan blades.

The fan is said to have met with much favor with truck drivers especially in that it helps materially to cool the driving compartment. The Hi-Lo fan is made by the Hi-Lo Products Co., 52 West Jackson boulevard, Chicago.

The entire assembly is made almost foolproof and it is practically impossible to assemble parts in a wrong manner. Anybody can take it apart and put it together correctly and change the rotation from a clockwise to anti-clockwise direction in a few minutes.

The driving member is adjustable to the finest degree for timing and through the use of a coupling disk, a most flexible and yet definite drive is accomplished. There is nothing in the interior of the coupling to get out of order and the unit once installed requires no attention whatsoever. It can be installed on all types of Bosch Magnets.

### UTICA OIL-RAC



*The Utica Oil-Rac, shown here, is announced by the Utica Compressor Co., Utica, N. Y.*

## Insulated Head Feature Of Williams Piston

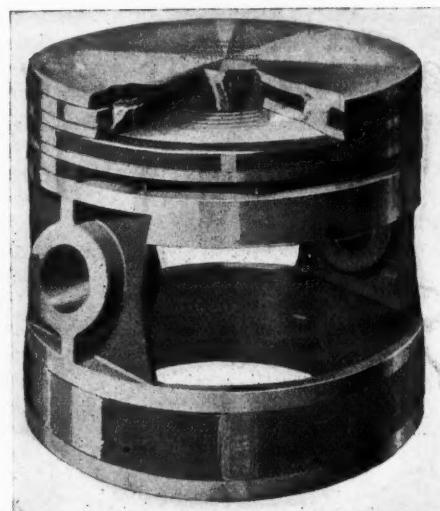
THE Williams piston, made by the Illinois Alloy and Manufacturing Co., Chicago, Ill., possesses several novel features, chief of which, perhaps, is the insulated head, locked to the body from the underside by two grub screws. The head and body are cast of aluminum alloy, and are said to be 60 per cent lighter and 50 per cent stronger than cast iron.

There is a metal insulating gasket cast in the piston head which prevents the high temperature of the combustion chamber from passing down through the piston and thereby affecting the quality of the lubricating oil. The piston is of the open type, which allows lubrication on the up and down stroke, insuring, it is stated, good acceleration of the engine.

The skirt cast in the piston and the rings are made of a material called Pistonoy, a metal alloyed and treated to rapidly polished cast iron and steel. This metal, it is stated, will cause the cylinder bores to take on a mirror-like surface and under no condition, even though lubrication fails, will the metal score or cut, owing to its extremely low coefficient of friction. The William piston is fitted with a clearance of .001 in., the piston skirt expanding no more than the cylinder bore.

The combination of non-expanding skirt and crimped springs back of the rings prevents lateral motion, effectively eliminating piston slap.

In a test conducted some years ago a car equipped with these pistons was run from Cleveland to Chicago and was lubricated with a solution made up from four bars of soap and two gallons of water. At the finish of the test the engine and its parts showed no ill effect from the novel method of lubrication. The test merely was made to show that no serious damage would result even



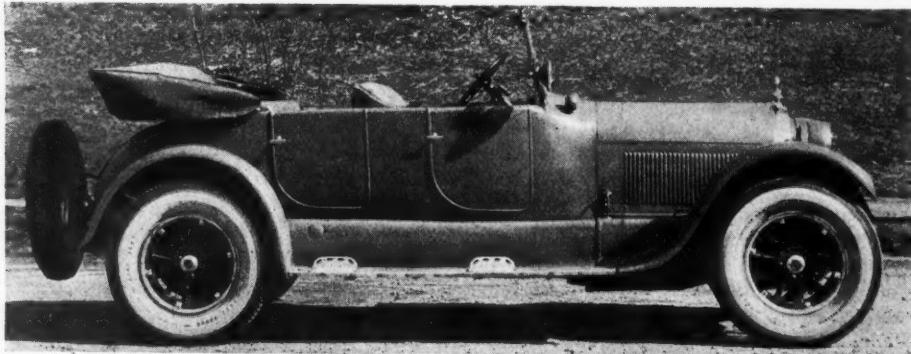
*Part sectional view of the Williams piston, showing the insulated head and Pistonoy skirt cast in the piston*

though a very poor lubricant was used. The company states that tests have been made on the pistons wherein the engines were run without any lubricant. Naturally the pistons froze in the cylinders, but when released no bad effects were in evidence to the parts involved.

In the above case the main and connecting rod bearings consisted of metal known as Bearingoy, also made by the Illinois Alloy and Manufacturing Co. This metal, it is stated, will not cut, stick or score the crankshaft regardless of the condition of lubrication. Dry tests have been run for 500 hours with a bearing pressure of 60 lbs. at 1600 r.p.m. without any damage to the shaft or bearings.

The company, of course, does not advocate the use of poor lubricants just because of the peculiar qualities of this metal. It insists that the best oils be used.

## Another Used Car Suggestion



HOW the addition of Vogue balloon tires with the original artillery wood wheels cut down without making any changes in the chassis, converted a 1919 Peerless four-passenger roadster into an up-to-date car is shown in the above photograph.

In addition to the Vogue balloon 34 x 7

tires a 1924 Peerless radiator shell was installed over the old 1919 core with a new 1924 hood to match. The car is upholstered in tan color linen fabric with a Burberry khaki top. Painted an artillery gray with natural wood wheels, the entire car is a gray tone.

## Chevrolet Tuning-Up Valve

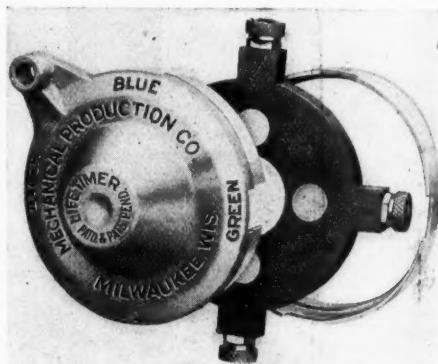
A NEW tuning-up valve, designed especially for the Chevrolet, built and sold especially for the Chevrolet, has been added to the line of Petry Products, manufactured by the N. A. Petry Co., Inc., 328 North Randolph street, Philadelphia.

One of the features of this new Chevrolet type Petry Tuning-Up Valve is the slender slot accurately machined out of the bore in the forward end. This slot is to accommodate the raised seam common to Chevrolet exhaust pipes. It insures a perfect fit that is leakproof.

The Chevrolet Special Petry Tuning-Up Valve is of the modern dash controlled type. The positive, flutterless action of the springless mechanism is controlled by one of the new popular Petry Dash-Controls, finished in a handsome buffed black.

### LIFE TIMER HAS NOVEL CONSTRUCTION

The Mechanical Production Co., of Milwaukee, Wis., have developed a Ford timer which has some novel features. The main portion of the device is a bakelite disc in which are molded brass inserts which extend to both sides of the disc. This disc carries the terminals and is reversible so that when worn on one side, it can be turned over, giving the effect of a new timer.



The rotor contains a spring mounted button capable of making contact with the commutator, even with considerable end play in the camshaft. Both the selling price of \$2 and the novel construction should make this a fast selling accessory.

### FREE EMERGENCY SERVICE

SACRAMENTO, Calif., April 12.—Mechanical first aid and free tow service in San Francisco and the Bay District have been inaugurated by the California State Automobile Association. The service, which is free to members, provides for simple mechanical adjustments where a car stalls on the road and for tow service in case of a wreck.

In San Francisco and the Bay District the service is being rendered by the association's own cars and motorcycles, but in the other places the service will be through local garages. The service also includes tire repair service for unescorted women members.

# Servicing the Ford Chassis

*What to Do in Reconditioning the Rear Axle, Front Axle, Steering Gear and the Radiator; Proper Equipment Just as Essential as in Properly Servicing the Power Plant*

By B. M. IKERT

In GOING after the service work on the Ford chassis it is just as essential to organize for it as it is to provide suitable means to properly service the power plant.

We would not think of tearing down and reassembling an engine without placing such an engine in a stand of some kind, and what holds true of the engine also holds true of such units as the rear axle, front axle, and so on. In other words, the work must be properly done with the right kind of equipment.

In dealing with the work of servicing the Ford chassis we have confined ourselves to four major topics and while these do not by any means cover the entire Ford chassis, they represent the units on which as a general thing the greater share of service and maintenance work is performed.

For convenience these four subjects have been divided as follows:

1. The rear axle.
2. The front axle.
3. The steering gear.
4. The radiator.

Before going ahead with the work steps should be taken to see that there is on hand such things as a hoist, floor jack or some other suitable means for lifting the front and rear end of the car so that the axles can be removed.

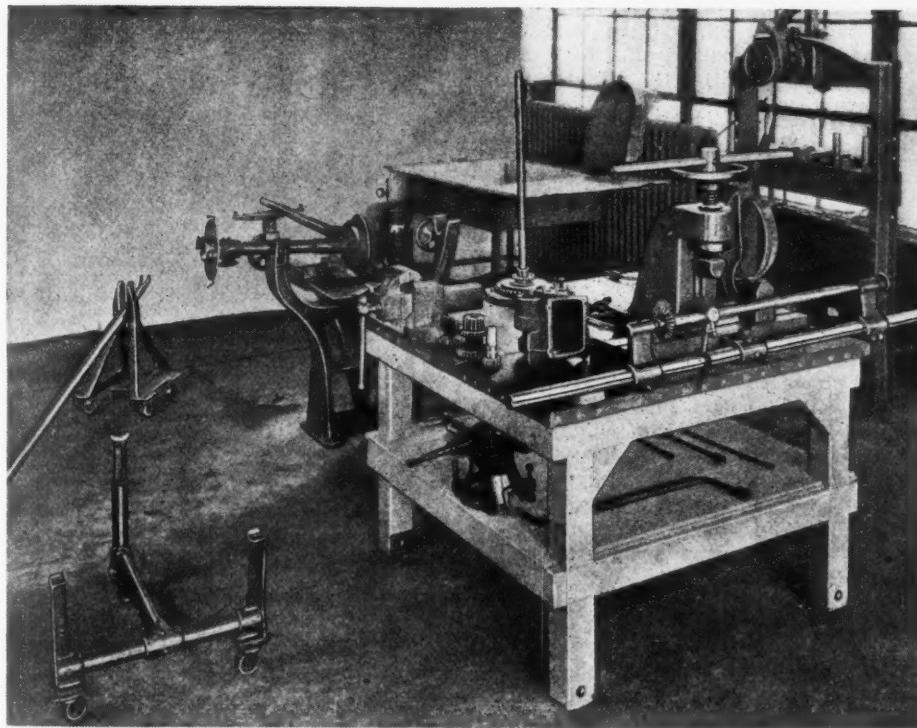
Many shops have lifting hooks for this which grip the rear end of the frame and also the front end and by this means lift the front and rear end alternately.

It is also an excellent plan to have a cleaning tank on hand where the parts can first be immersed in the cleaning fluid and thus come to the mechanics in a condition to be properly torn down. Half of the time spent on a job is devoted to cleaning the parts and the job of cleaning might better be turned over to a helper or boy.

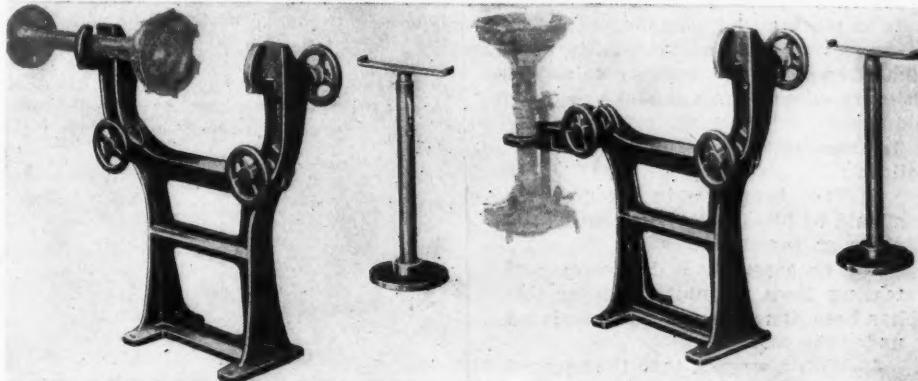
## The Rear Axle

Assuming that the car has been raised so that all the weight at the rear end is off the wheels the procedure of taking out the rear axle unit is substantially as follows:

- 1—Take off the hub caps.
- 2—Take out the cotter pins on the ends of the axle shafts.
- 3—Remove the nuts which hold on the wheels.
- 4—Take off the wheels, using a wheel puller.
- 5—Take out cotter pins and with a speed wrench remove the perch nuts from the inside of the brake flange. This loosens the springs from the axle.
- 6—Disconnect the brake rods at the front end.
- 7—Take out cotter pins and with a long speed wrench remove the four nuts from the universal joint flange bolts.
- 8—This leaves the axle entirely free from the car and it may now be



*In order to efficiently carry out maintenance work on the Ford chassis, it is just as essential to provide suitable equipment to handle such units as the front and rear axles, as it is to provide an engine stand when working on the power plant. Above is a bench and rear axle stand especially suited to do work on the Ford rear axle. There are several good axle stands on the market*



*Here is shown another style of rear axle stand for Fords which makes it possible to swing the axle into any position. One man wheels the axle assembly up to the stand and the rest on the stand is swung down to receive the axle. One of the illustrations shows how the axle housing is clamped fast in the movable chuck of the stand and swung out at the angle where the mechanic is able to replace the sleeves, etc., without difficulty*

placed in a suitable stand, as shown in some of the accompanying illustrations.

To disassemble the rear axle proceed in the following manner:

- 1—Remove the two nuts at the ends of the radius rods.
- 2—With a long handled 7/16 in.

socket speed wrench, remove the torque tube retaining nuts.

3—The driveshaft housing or torque tube can now be pulled from the unit and with it will come the driveshaft and pinion.

4—Next remove the nuts and bolts which hold the halves of the axle housing together. The latter may now be pulled apart. Care must be taken to have a grease pan under the stand to catch the lubricant.

5—Remove the keys from the shafts, the right one before the housing is slipped off and the left one after the right half is off. Take out the three bolts in the differential housing, which will permit entire disassembly of the unit.

6—The worn parts should be replaced with new. No fitting of the parts is required with the possible exception of the babbitt thrust washer which, if too tight, will have to be taken down a little with a file.

To take apart the driveshaft assembly, the following steps are necessary:

1—Take out the top and bottom pipe plugs from the front end of the driveshaft housing. Turn the shaft until the universal joint pin comes into view.

2—Drive out the pin.

3—Drive the universal joint away from the housing.

4—Take out cotter and remove the nut on the end of the shaft at the pinion end.

5—The next job is to get off the pinion and this can be done with a press or puller of which there are several types on the market.

6—if a new pinion is necessary it may be forced on in the reverse manner that it was removed.

7—Test the axle shafts and drive shaft for straightness and if they are bent they must be straightened in a press.

In replacing the parts care must be taken to see that everything is set up tightly and that new cotter pins are used in every case. It is a mistake to use the old pins.

To reassemble the units proceed as follows:

1—The bearings in every case should be filled with lubricant as the parts go together.

2—The assembly is the reverse of tearing down the unit and after this has been done the axle can be placed under the car.

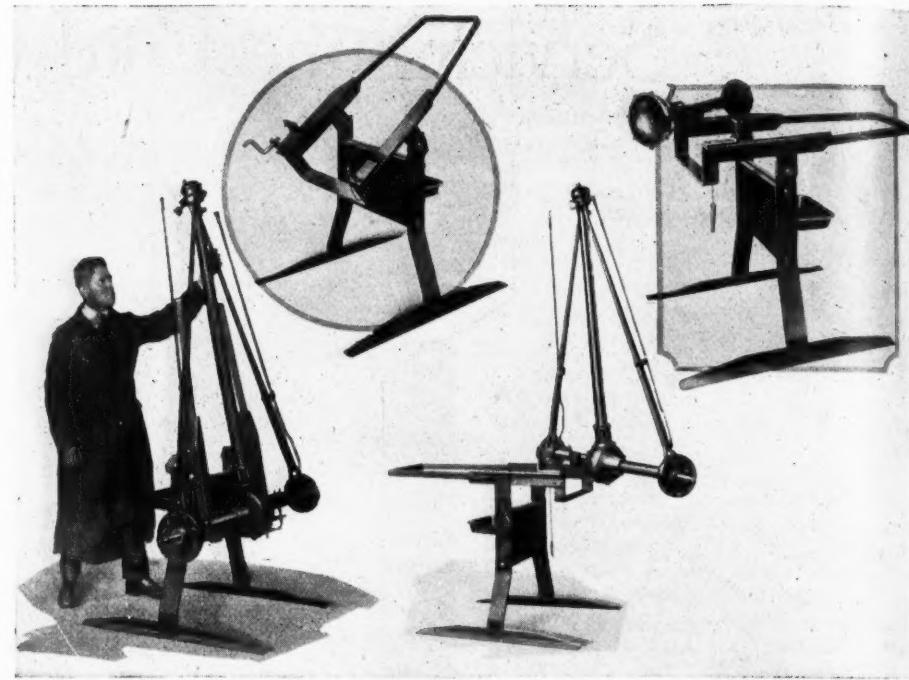
3—with a wrench turn the squared end of the universal joint so it will readily enter the square hole in the end of the transmission.

4—if necessary a new gasket should be placed at the universal joint flange.

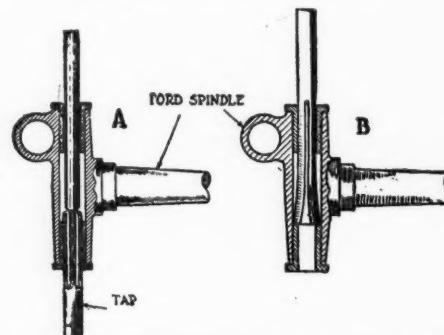
5—the bolts in the flange are now tightened, putting cotter pins on the nuts.

6—Connect the springs to the axle.

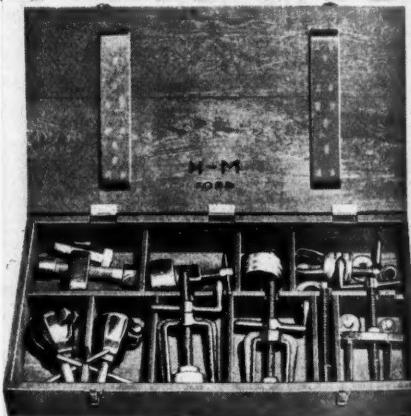
7—Connect the brake rods. If adjustment is necessary this can be done by loosening the lock nut and turning the yoke in or out until the proper adjustment has been obtained.



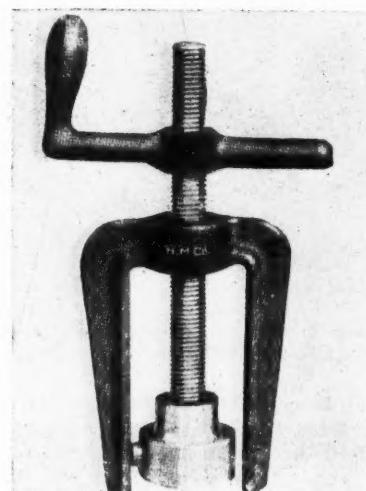
Here is shown a universal front and rear axle stand which is equipped with a liberal size grease pan which goes on the cross member and catches the dirt and grease from the differential. Both arms have three positions, vertical, 45 degrees and horizontal



There are many ways of taking out the spindle body bushings and two of these methods are shown above. A shows a tap started in one of the bushings so that an old spindle bolt can be driven against the bottom of the tap, both tap and bushing being driven out. B is a split pin which is compressed to get it in the top bushing, the tool then splitting out so that it will push the other bushing out



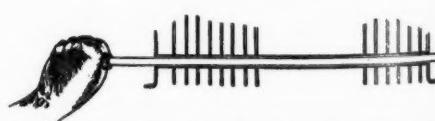
About the most useful tools in connection with servicing motor vehicles, Ford and otherwise, is a set of pullers. Here is shown a box of unit Ford pullers furnished by one concern. The best thing about using pullers is that the work can be done much more quickly and efficiently, as is the case of where a hammer and drift are used. Gear and wheel pullers do not mar the surfaces and there is little likelihood of doing any damage to the parts involved



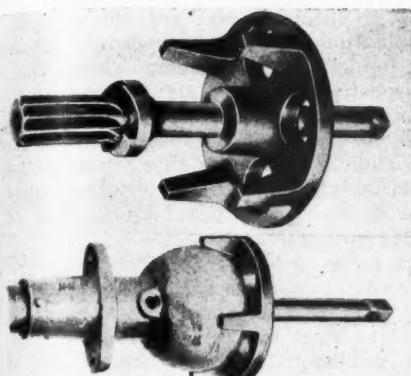
Drive pinion gear puller. This tool makes it easy to remove the pinion on the end of the driveshaft



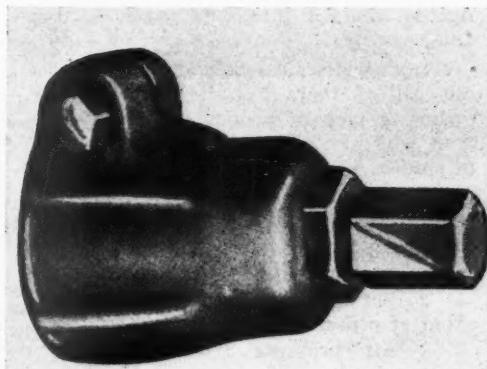
A very useful tool in connection with front axle work is a bending iron. Such an iron has sufficient leverage to bend any part of the axle I-beam



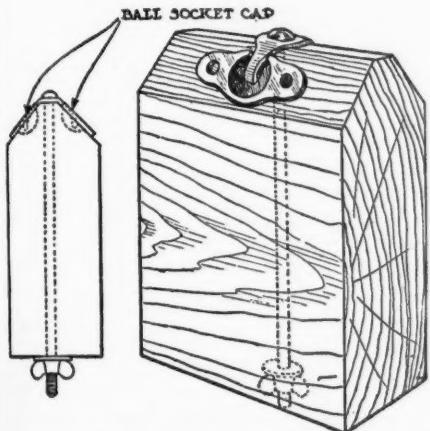
Bent tubes in the Ford radiator can be straightened out by forcing a rod through the tube



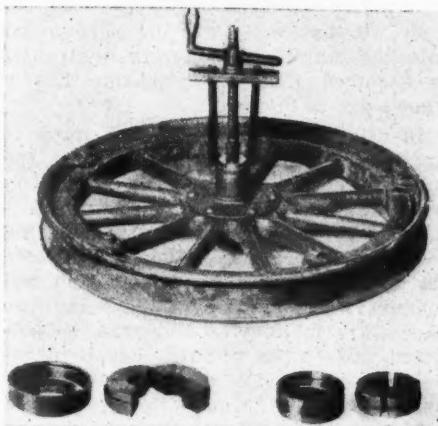
Combination driveshaft reaming and facing tool for Fords. This tool reams and faces the driveshaft bearing in the front end of the propeller tube



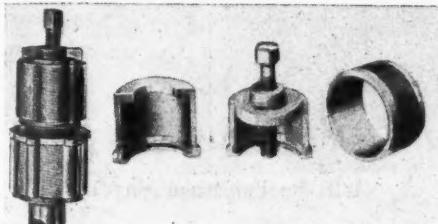
One of the most useful tools in maintenance work on Fords, is a wheel puller, a type which is shown above. The main thing to watch out for in buying a wheel puller is to see that it is made of good material and the threads well cut



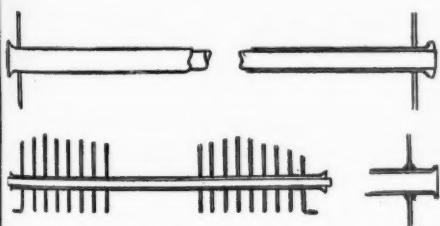
When wear takes place in the ball caps on the ends of the steering rod metal must be taken off the caps to make them fit closer. A handy device is a jig such as shown above. Two ball caps are clamped in the jig and the faces ground on an emery wheel



Above is shown a bushing extractor which is useful in extracting bushings of every type. When used in connection with the fittings shown it will pull the ball races from the front wheels which ordinarily is a very difficult job



Axle bearing sleeve puller. This tool is used for removing the Hyatt roller bearing sleeve from the rear axle housing



The above sketch shows the successive stages in inserting a tube inside a leaking tube of the radiator

8—Put on the wheels, making sure that the keys are in place.

9—See that the pipe plugs are in place on the driveshaft housing.

10—Replace grease cups and see that they are filled with lubricant.

#### The Front Axle

If the front axle assembly is to be removed from the car, a hoist and jacks are necessary, as in the operation of removing the rear axle. In raising the car from the floor, obviously, the apparatus used must not come into contact with axle, otherwise the latter cannot be removed. With the car elevated, proceed as follows:

1—Take out cotter pins and remove the nuts which hold the ball cap of

the radius rod.

2—Remove the nuts and bolts from the cap on the ball socket on the lower end of the steering arm.

3—Take out the bolts in the spring shackles.

4—The unit may now be removed from the car and taken to an axle stand for disassembly.

5—Remove the hub caps by holding the wrench stationary and spinning the wheels.

6—Take out cotter pin and remove the nuts on the spindles.

7—Take off the lock washer.

8—Unscrew the outer cone and take off wheels. The parts should be washed off with kerosene and the balls and races examined for wear.

It always is best to replace an entire set of balls, as they will then be of uniform size.

9—Replace the felt washers, if necessary, as they may have lost their elasticity.

10—If the bearing races are worn they can be removed with an arbor press, using an outer and inner ball race driver.

11—In adjusting the wheel bearings the outer cone should be set up just tight enough so there is no shake to the wheel and yet the latter must turn freely.

12—If the spindle body bushings need replacing, the old ones may be removed in several ways. Two methods are shown herewith.

13—The new bushings must be reamed to size with a special reamer. Some of these reamers may be used in connection with a special jib, which insures the holes being reamed in line. If a line reamer is not available, the bushings should be taken out one at a time, using the old bushing as a guide.

14—It may be necessary to file the bottom bushing with a mill file so that the spindle body with its bushings will just fit between the axle lugs.

About the only work necessary on the front spring is to rebush the eyes and fit new shackle bolts. Use an arbor press for inserting bushings after which the latter are reamed to size.

15—Test the front axle I-beam for straightness and if bent it may be straightened by using a heavy bending bar. A template made from a straight axle can be used as a guide.

16—Before assembling the axle place two steel bars, one in each end of the axle yoke, the bars going into the same holes used by the king pins. Sight across these bars. Any misalignment will be noticed readily.

17—If the radius rod is bent it had better be replaced with a new one.

18—Play in the steering arms can be taken out by removing the pins and bushings and installing new ones.

#### The Steering Gear

About the only work necessary in the maintenance of the Ford steering gear is to take up lost motion or replacing broken parts with new. Lost motion may be due to any of the following:

1—Worn drive pinion, internal gear or planet gears.

2—Wear between the ball caps on the bottom of the steering arm and at the right side of the tie rod.

3—Wear in the steering knuckles and pins.

4—Wear in the spindle bolts and bushings, ordinarily taken up in connection work on the front axle. To take down the steering gear:

1—Remove the nut on top of the steering wheel.

2—Drive off the wheel with a block of wood and hammer.

3—Remove the lock screw and un-

screw the cover of the gear case and lift it off.

4—Remove the pinion gears.

5—Take out the bolts which hold the column to the dash.

6—Remove nuts and bolts from cap on lower end of steering arm.

7—Remove timer and throttle operating rods.

8—Loosen the steering gear frame bracket which will permit of the column being removed from the car.

9—if there is lost motion in the ball caps on the steering gear, the caps can be taken down on an emery wheel, holding them in a jig as shown herewith.

10—Take off only enough metal so that there is no rock to the caps.

11—Pack the caps with grease.

12—Inspect and replace any worn parts in the upper part of the steering gear, including the arms on the timer and throttle shafts.

13—The steering gear assembly is the reverse of the disassembly.

14—Examine the steering gear for lost motion. If it works too hard the ball caps may have been set up too tight. Remember, also, that the adjustment of the front wheels, the fit of the spindle body and king pin influence lost motion.

#### The Radiator

The Ford radiator is of the tubular type and the main thing in serving it is to stop leaks. This operation basically

can be divided into two parts, testing and repairing.

Many service stations and garages send out all of their radiator repair work owing to lack of proper equipment and men who are skilled in the application of solder.

The apparatus to have on hand for radiator work should consist of the following:

1—Testing tank.

2—Set of plugs to stop up inlet and outlet pipes.

3—Air pressure from tank or pump.

4—Oxy-acetylene welding outfit with smallest tip.

5—Scrapers, knife, punch, pliers, light hammer, emery paper, solder, soldering compound, rod for straightening tubes and a brush.

No attempt will be made here to go into the details of soldering because it is assumed that the mechanic has a knowledge of this art.

In using the air pressure the latter is applied to the overflow pipe after the inlet connections have been closed up with the plugs. The radiator is then immersed in the water contained in the testing tank. Naturally the air will force its way through the radiator and the bubbles will show where the leaks are. These are marked so they can be soldered. After the radiator has been repaired it can be tested in the same manner using about 12 to 15 lbs. pressure.

If the test shows that there are only a few small leaks in the tubes, it is pos-

sible to insert special thin tubes in the original ones, soldering them in place on the top and bottom header. This method of repairing should only be confined to jobs wherein not more than two or three tubes are at fault, because naturally the insertion of the repair tubes reduces the internal diameter of the original tubes and materially reduces the amount of water circulation space.

In order to insert the repair tubes the original tubes must first be straightened and this can be done by running a straight steel rod through the old tube. The rod should have a rounded end so that it will not dig into the tube but rather tend to straighten out the bends and kinks.

The next job is to flare or bell-mouth the ends of the old tubes and scrape them clean with a knife. The repair tube is then slipped into place and is cut off so that the ends extend about 1/16 of an in. beyond the old tube.

The solder is then applied to both ends of the tube, heat being applied with a small tip of the welding outfit. The successive steps for doing this are shown in one of the accompanying illustrations.

A word in regard to mounting the radiator. The mechanic must make sure that the springs are in place on the radiator hold down bolts. The nuts on the bolts should not be set up so tightly that the spring action is destroyed. The function of the springs is to permit the radiator to slightly weave when the car is in operation and if the springs cannot properly act, naturally the strain falls on the radiator, often causing damages.

#### Our Annual

## SUMMER SERVICE NUMBER

Will Be Published May 15

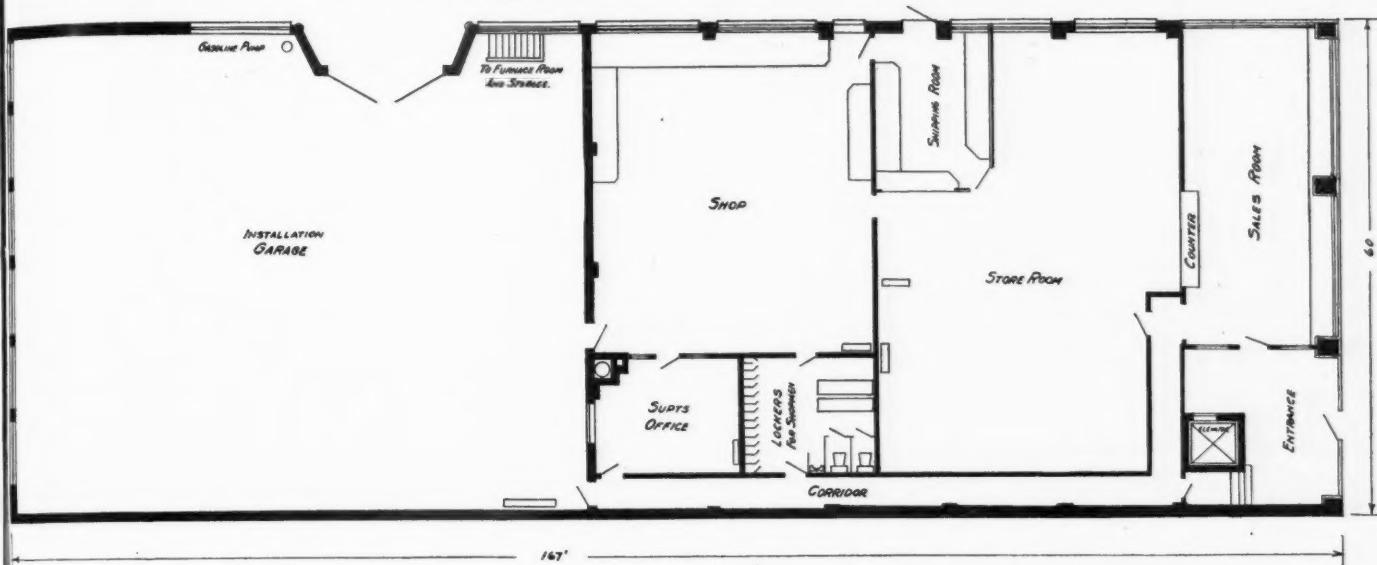
*The annual SUMMER SERVICE NUMBER of MOTOR AGE, which our readers have become accustomed to look forward to each spring, will be issued on May 15 this year.*

*We are working to make this the most valuable SUMMER SERVICE NUMBER ever published by MOTOR AGE and we hope that the quality of the contents will compensate our readers for waiting a few weeks beyond the time they have usually received this issue in previous years.*

*Our technical staff is busy with the compilation of information that will help every shop engaged in the sale or maintenance of automobiles and automotive equipment. This wealth of information will be brought to you at the beginning of what promises to be a very busy summer season and we believe that every proprietor and his employes will find inspiration and helpfulness in it.*

THE EDITOR.

# Electrical Sales and Service Station Designed as Model



The floor plan shows the neat arrangement of the building—everything is laid out in a manner, making for the greatest efficiency

**I**N KEEPING with its desire to have all of its branches equipped not only to function properly as wholesale distributing centers, but to serve as model sales and service stations, the American Bosch Magneto Corp., of Springfield, Mass., has just completed a new building for its Detroit branch.

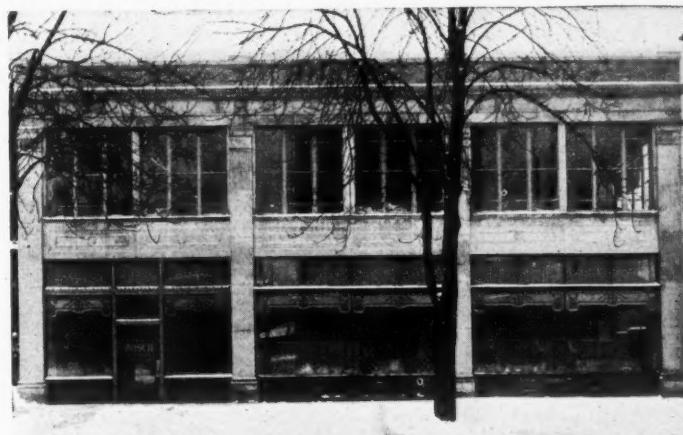
The new building is located at 89-95 Hancock Ave., West. It was designed especially to serve the needs of the Detroit territory of the Bosch corporation, which includes the states of Michigan, Ohio and parts of Indiana, West Virginia and Kentucky.

This expansion was made necessary by the increased service business, and by the wider marketing activities which the corporation is now engaged in. The sales of service parts and complete units are handled at the stock room counter, which opens directly into the sales room. Repair and installation work is handled through the shop superintendent's office, where technically informed men are available. The entrance to the shop office is through the main corridor and those proceeding to that office are in immediate proximity to the installation garage and shop, where their units are in work. The city sales department is located in the open corridor or sales room, within easy access to stock, shop and garage, so that matters of local sales, repair and installation can be given quick and proper attention.

It will be noted that the shipping and receiving departments are located most conveniently to the shop and stock departments, thereby reducing handling costs and insuring prompt service on incoming and outgoing receipts.

Modern shop practice is followed out in the repair department. All test equipment and machine tools are equipped with individual motor drive and are grouped for ease of access from any part of the shop. The general offices are located on the second floor, occupying 3,600 square feet, giving adequate facilities for the present, and ample room for future growth.

To provide for the quick handling of inter-departmental correspondence as well as for ease in communication throughout the building, pneumatic tubes are provided from the shop office and stock room to the general offices and all departments are equipped with the Dictagraph automatic system of inter-communicating telephones.



The front is attractively designed and with as little brick as possible. The glass allows better lighting and ventilation. The show space in the window is, of course, devoted to the display of Bosch products



The interior where the customer is greeted by a clean, light show room. The sales counter has enough parts stocked in the bins behind it to take care of any demand

## Reo Motor Car Co. of California Opens Its New Home



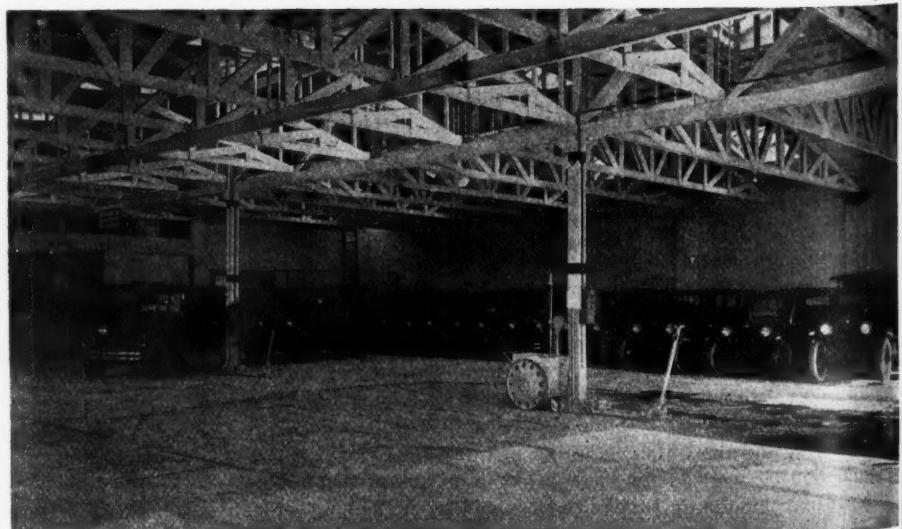
*In the shop, every mechanic has his own bench, each bench has air and gas connections and welding may be done by each mechanic as needed. A view of the salesroom is at the right. In the rear is the used car alcove*

DEVELOPMENT of the branch idea in automotive sales is attested in the recent opening in Sacramento of the new home of the Reo Motor Car Company of California, Inc. The company has branches in practically all the larger cities of California and the home of the Sacramento branch is considered one of the most attractive and best arranged, giving an opportunity for more efficient sales and service that previous locations had denied.

The building, which is of the Spanish style so typical of California, was erected especially for the Reo company at a cost of over \$40,000. The structure measures 80x160 feet and stands on a corner. A salesroom 80x40 feet faces K Street, Sacramento's leading thoroughfare. The shop is 80x95 feet. General offices, a unique used car alcove, manager's office, service manager's office, parts room, rest rooms for the customers and employees, etc., also are provided.

### White and Grey Used in Shop

The shop is finished in white with just enough gray to prevent any glare. All corners are finished in white to discourage the accumulation of debris and large red markers indicate the location of all fire extinguishers. A storeroom for heavy parts is over the parts room. A filing cabinet system is used for the storing of all smaller parts. Lubricating oil is stored above the parts room giving a gravity flow to faucets located in the parts room. All mechanics have separate benches and master tools are kept in the parts room and checked out to employees as needed. The wash rack and lathe equipment are located in one corner of the shop.



*Above is a general view of the sales floor which also shows a corner of the office, corridor to the shop and the manager's office. Below is a general view of the shop*



Louis R. Roth

# This Shop Increased Its Business 700 Per Cent in One Year

*You Can Do It, Too*



Isadore Schoenberg

DURING the week ending February 15, 1922, at which time Roth Bros., automotive shop at San Antonio, Texas, underwent a re-organization, the total volume of business was \$2,400. Just one year from that date the normal weekly receipts amounted to \$21,000. Plans are all set for doing a half-million dollars worth of business during 1924.

In this comparatively brief period the work has jumped from that which required four men until now there are 35 mechanics regularly employed. The floor space has been gradually increased from 6,000 square feet in February, 1922, to more than 20,000 feet, and plans are under way for the erection of a modern two-story, fireproof brick building, at a cost of approximately \$100,000, which will give additional floor space of 24,000 square feet. The actual increase in business during the first year amounted to more than 700 per cent, and it is still increasing almost as rapidly.

When a repair shop's receipts jump at such a rate as this, there must be something behind it—there's a cause; and the policy and idea that brought about this rapid increase ought to be of value

to other garagemen, in one way or another.

Before going into the sales ideas, however, let us take a glance at history of the shop and at the men behind it. The business was started several years ago as a livery service, featuring in the beginning the telephone number, Crockett 2000. Later the livery business was discontinued and in its stead a small automobile repair shop was established. The firm was known as the Roth Brothers Auto Supply & Machine Company. In February, 1922, a member of the old concern, Louis R. Roth, and Isadore Schoenberg, then sales manager for a local real estate concern, purchased the business and continued it under the name of Roth Bros.

Immediately after the new owners took over the shop they began formulating some unusual sales ideas, and they are ever on the alert for the "different," yet practical, idea for bringing new business.

One of the first things the young owners did was to adopt a sort of "trade color" for all of their service trucks, signs and other advertising material.

The company now operates three Cadillac Eight wreckers and seven Dodge Brothers service trucks, all of which are kept snow-white at all times. They are re-enamelled every 90 days, besides always being kept clean. This lends an immediate distinction to the concern's service cars. They stand out conspicuously anywhere, regardless of the number of other trucks and cars that may be in motion. One of the shop's customers calls the service trucks big "white angels," because they may be seen at such a great distance, and because they are on the job when most needed.

## "We Treat You White"

Harmonizing with the color of the trucks, the shop adopted as its slogan, "We Treat You White." This appears not only on the service trucks, but on letter-heads, bills, road signs and in any other places that may seem appropriate.

There are 5,000 road signs doing service for the concern. They are of white letters—enamelled—on black background of substantial metal. These signs confront the motorist on every important road leading into San Antonio for a dis-



Fleet of "We Treat You White" service trucks maintained by Roth Bros.

tance of 50 miles or so. The features of the signs are the firm's name, telephone number—Crockett 2000—and the fact that they give both day and night service.

In the matter of service, the concern gives away nothing. Whether a customer phones in to have a tire changed or wants to buy a new cord, if the job requires the use of a service truck and one of the shop's men, a regular service charge is made.

"We operate our service as a separate department," explained Mr. Schoenberg, who is secretary-treasurer of the company. "It is self-supporting, the same as our parts department or our tire stock. It is an independent unit outwardly, and we encourage the entire public to use it, whether they are customers of ours or not. Since we make a profit on the service, regardless of whether or not we sell anything on a trip, we want all the service business we can get."

"But, don't your regular customers object to paying a service charge when you deliver gas, or a tire to them?" he was asked.

"No; they do not mind paying for it, because they know they can rely upon us. By keeping our trucks going 24 hours a day, seven days in the week, we are always ready to give a man service when he needs it. At night and on Sundays is when the majority of motorists use their cars most, and that is the very time most service stations are closed. Regular customers do not mind paying for what we do for them, so long as they know we are ready to help them at any time of day or night. By making a reasonable charge for the service we render, we are able to keep our service department active, and modern in every respect, because it is self-supporting."

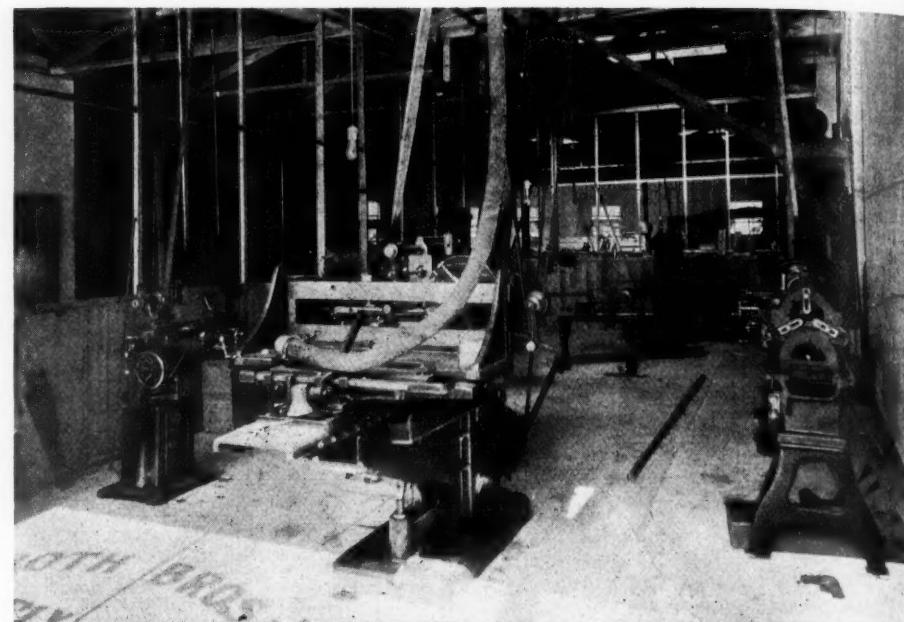
The seven service trucks answer from 40 to 75 calls every 24 hours, and it is not unusual for the three wreckers to pull in 25 cars a day. One day during a recent siege of rainy weather, the service department pulled enough cars out of the mud to net \$185.

For towing in a wreck the shop makes a minimum charge of \$3. This is for the city limits of San Antonio only; outside the city a sliding scale is used in charging, so much per mile, according to the distance out. There is a charge of fifty cents per call on service trucks within the city, and fifty cents per mile additional is charged for calls outside the city limits.

#### Sell Service Insurance Policy

This charge is enforced, whether it is a tire-changing job, carrying gasoline or delivering a new tire. The fifty cents is added to whatever other material the customer buys, whether it is a quart of oil or a pair of cord tires and tubes to match. Only by supplying service that is absolutely prompt and reliable can a concern afford to charge for delivering tires and other merchandise to regular customers, declares Mr. Schoenberg.

Where an automobile owner does not



*The right equipment for the job is one secret of Roth Bros.' success*

desire to be bothered with a fifty cent charge every time he has trouble on the road he has the option of buying one of the firm's "Insurance Policies." This costs \$10 a year and in return for that sum of money the shop gives the car owner a certificate which entitles him to service at any time of day or night anywhere within 20 miles of San Antonio, whether he is out of gas, has a puncture or is wrecked. The only additional cost there is to him is the gas, tires or materials that are delivered to him.

#### All-Night Repair Service

This form of paying for service is especially attractive to professional men, over 500 of whom are served in this way by the company. The policy covers not only passenger cars, but commercial vehicles as well. Naturally there is no distinction between the class of service rendered "insurance policy" holders and motorists who pay the straight charge, and by keeping the "insurance" end of the business as prompt and reliable as the regular charge service, this feature of the service department is proving highly profitable to the company and popular with the public.

The certificate which a car owner gets upon paying his \$10 resembles a regular insurance policy in many respects. It tells in detail just what service it provides for, so there is no misunderstanding later on.

An idea that has done as much as anything else to bring about such a wonderful increase in this concern's business is the addition of night repair service. The shop now maintains three complete shifts of workmen, and repairing is done 24 hours every day. Although this is the only shop in San Antonio that makes a feature of its night repair work, and although San Antonio is a city of nearly 200,000 people, such a service could be profitably featured in many much smaller towns. The success

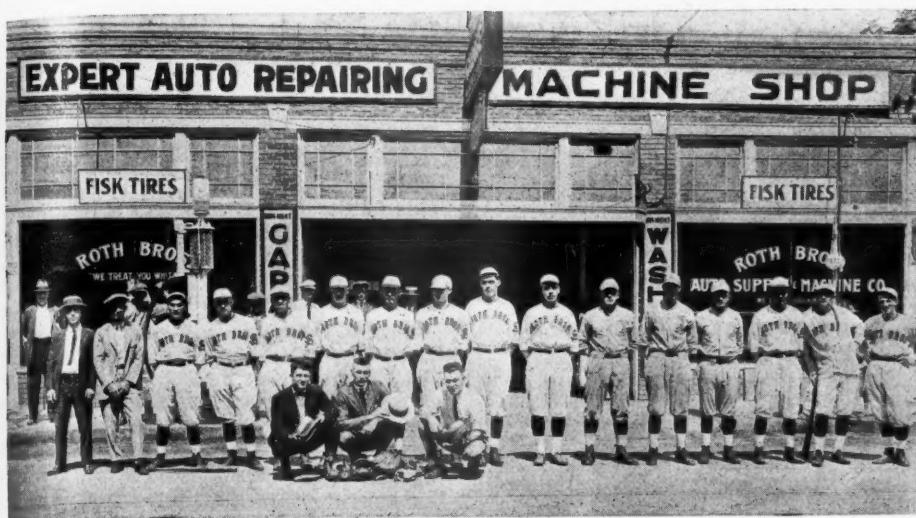
of this phase of Roth Bros. business is evidence of that fact.

About three months after the present management took over the business a night shift of two men was added to the force and the shop was kept open all night. For the first few weeks the two men took in from \$20 to \$30 per night—just about enough to pay expenses. At first only emergency jobs on commercial cars, where the owner had to have his truck next day, were accepted. This limitation was put on because the owners did not know for sure that the night service would pay. The experiment proved entirely satisfactory, however, and they went after this night business in earnest.

At the present time there are never less than 10 men employed on the night shift, and often there are 12 to 15. Repair work runs not less than \$100 a night, in addition to selling 300 to 500 gallons of gasoline. The night repair service, likewise, helped to materially increase the business of the service department, which of course operated during the night, even before the repair service was inaugurated. A motorist with a crashed car is more glad to pay the towing fee of \$3 when he knows that he can call around at the shop next morning before office hours and get his car, all fixed up and ready to go.

This night repair department is especially attractive to operators of trucks who need them continually. Milk men, truck farmers and others who own only one or two trucks and need them every day, find this service a salvation to them. By using it they may have their trucks overhauled at any time without the loss of a minute's time from regular work.

The plan is helping, also, to reduce the number of trucks in operation by large fleet owners. By utilizing the night service the owners do not have to maintain extra vehicles for use while others are being repaired. Although this de-



This baseball team has built up a fine spirit of cooperation among employees of Roth Bros.

partment is maintained primarily for commercial car owners, it has now grown to such an extent that any sort of repairing is accepted, whether commercial or passenger car.

Mr. Schoenberg declares that a job may be turned out at night even cheaper than during the day, because workmen are not interrupted as much as they are during the day. As there are regular night crews, there is no overtime to be charged to any job.

When the experiment had demonstrated that such a service would be profitable it was brought before the public as quickly as the concern could tell about it. Liberal newspaper space was utilized, and the local papers gave considerable editorial space to it, because the service was novel for the city. A multigraphed letter, with names carefully filled in, was sent to each commercial car owner in the county. In addition to this Mr. Schoenberg called upon most of the larger truck operators personally, telling them of the night

service and what it meant to the public.

A popular feature of the night service is brake lining. This phase of the business is advertised extensively and an important income has been developed in this line of work alone. The shop has a machine for the purpose.

The company operates its own machine shop and battery plant in conjunction with the regular repairing department. It carries a small stock of tires, from which approximately \$10,000 a year is sold, and a limited line of general accessories.

In addition to the regular repair business the firm is southwestern distributor for a number of manufacturers, and some of the most popular lines handled are the Stromberg carburetor, Kant-Skore piston rings, Economy oil pistons, Splitdorf rings and plugs, Logan gears, and Paige, Grant, Briscoe automobile parts.

Mr. Roth is president and general manager of the company and Mr. Schoenberg is secretary-treasurer.

times the amount collected from the motorists in 1913. A comparison of the figures show that while the amount of taxes paid during the 10 year period has increased 23 times, the registration has increased but 12 times. In other words the taxes during the decade have far outgrown the registration ratio and the money spent for highway construction.

#### BIG GAIN FOR MACK

NEW YORK, April 13.—Mack Trucks, Inc., sales in 1923 increased 41 per cent over 1922, according to the company's annual statement, which reports gross sales of \$43,866,957, against \$31,710,289. Net income was \$7,003,665, as compared with \$3,952,279, which is equal to \$20.71 a share on the common stock outstanding, against \$9.94 in 1922.

Net profits totaled \$8,053,665, against \$4,027,531, but these were reduced to \$7,003,665 by the payment of Federal taxes of \$1,050,000. Payment of \$2,577,891 left a surplus of \$4,425,774.

## Monoxide Poisoning

Just how deadly are the monoxide fumes from an automobile when running in a closed garage?

This question, more or less moot, has been made the subject of a thorough test just completed by the U. S. Bureau of Mines and which disproves the fallacy that the atmosphere in a closed garage is safe as long as an automobile engine continued to function.

Under the tests an ordinary touring car was run into a brick garage, having a capacity of approximately 3,000 cubic feet. A dog was placed upon the driver's seat, and the engine allowed to continue running at an idling speed, which is much slower than the average motorist would use for warming up purposes.

The doors of the garage were closed, and after 20 minutes operation of the engine, the dog lost consciousness and fell to the floor of the car. An analysis of the air at this time disclosed the presence of 1.3 per cent of carbon monoxide, which is sufficient to cause unconsciousness and death in a few minutes.

The automobile engine was allowed to run until it stopped from lack of air, which did not occur until after the end of one hour and 58 minutes. An analysis of the air at the time the engine choked down for want of air showed that the percentage of carbon monoxide present in the garage atmosphere was 2.1 per cent, an almost instantaneously fatal amount.

The engine functioned six times as long as the dog retained consciousness, proving conclusively that the continued operation of an automobile engine in a closed garage is no indication as to the condition of the air and that the engine will continue to function long after the operator has lost consciousness.

The experiment was conducted in a garage, several times as large as the average one-car garage and the Bureau of Mines declares that it would require less than one-half the time to repeat the same tests and secure the same results in a one-car garage. In other words the dog would have lost consciousness in ten minutes after starting the engine in a one-car garage, and the engine would have run for probably one hour.

Under the motorist's method of "warming up" his engine on a cold morning, in a closed garage, the Bureau estimates that two and one-half to three minutes will result in a fatality from carbon monoxide.

#### SURPRISE DINNER

ST. LOUIS, April 13.—Harry Newman was given a surprise dinner party by members of the sales force, office manager and maintenance division of the Harry Newman Nash Co. recently at Hotel Chase. The meeting was arranged ostensibly to talk over April sales plans.

Mr. Newman announced at the meeting that he was planning larger quarters for the firm. The company now occupies the premises at 5143 Delmar boulevard.

# Engineering for the Service Man

No. 12

## Some Fundamentals Behind the Design of Racing Engines

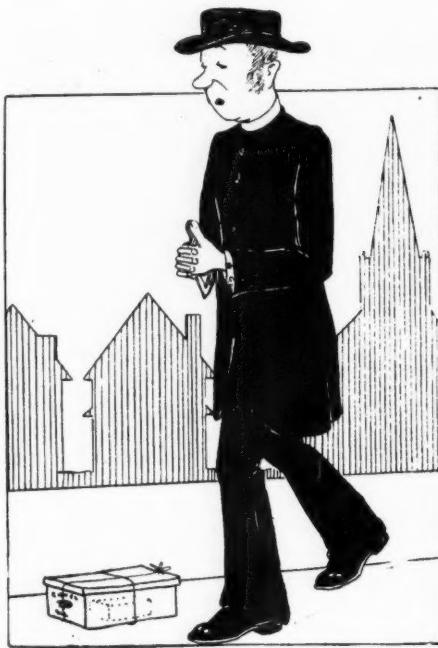
**I**T WAS a beautiful April morning, the sun was shining, the birds were singing, and the Deacon, on his way to church, felt the exuberance of his youth. He wanted to run, to jump, to play as he had done as a boy, to fly a kite or play marbles, but even the gentle breeze and the warm air could not quite make him forget his official position and dignity.

But what was that on the sidewalk? An empty shoebox, nothing more. So thought the deacon, forgetting the exact date, and some of the characteristics of his none too gentle youth. A glance here, and another there. No one in sight. The deacon balanced his angular frame on one lean extremity, poised the other for an instant as he felt he might have done on the gridiron, and heaved a mighty kick.

But alas for the deacon and his religion. The box was loaded with a wicked brick. The deacon swore an awful swear and from behind the hedge came a boyish snicker as the deacon held his injured toe.

History has lost both boy and deacon, but the discovery the deacon made is used in the design of racing engines of today and is built into the cars of tomorrow. Inertia, that property of matter which tends to make it stay in a condition of rest or uniform motion, is both an enemy and a friend. When the car strikes a stone wall inertia seems to be an enemy for it pushes the engine into the rear axle and throws the occupants of the car into a nearby haystack. When the hammer drives the nail through the tough oak, however, we call inertia a friend.

The question is often asked why a small bore high speed engine is more powerful than a large bore slow speed engine. The answer may be that it is not necessarily more powerful. We sometimes class as power the ability a car has to suddenly increase its speed and pass another car on the road, and for practical purposes perhaps that is a sen-



*The Deacon poised his angular frame on one lean extremity and heaved a mighty kick at the wicked shoebox*

sible way to look at it. The power developed in the engine however may be just as much in a car that does not speed up so rapidly, for the weight of the engine parts may be such that a lot of power is required to get them going.

If racing were nothing more than a question of sustained speed perhaps the light weight engine would not have so much advantage, but this is not the case. Race tracks are usually elliptical in shape, with straight runs at the sides and rounded ends, and the wise driver is one who shuts down somewhat on the turns and then opens up on the straightaway. To win the race therefore requires a car which can slow up quickly in entering the turn, and also speed up again quickly in coming out of the turn.

This ability in fact may win a race over a car that is faster on a straight track.

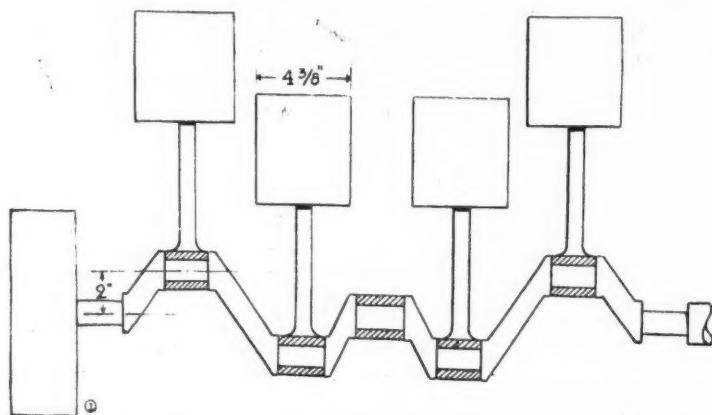
### Comparing the Short and Long Stroke Engine

In Fig. 1 we have diagrammatically shown a short stroke engine in which the piston diameter is 4.38" while the stroke is 4". In Fig. 2 we have another engine in which the bore is 3.58" while the stroke is 6". If now we figure the square inches of piston area on which the gas pressure can act we find that the large piston has 15 square inches surface while the smaller engine has 10 square inches area on each piston.

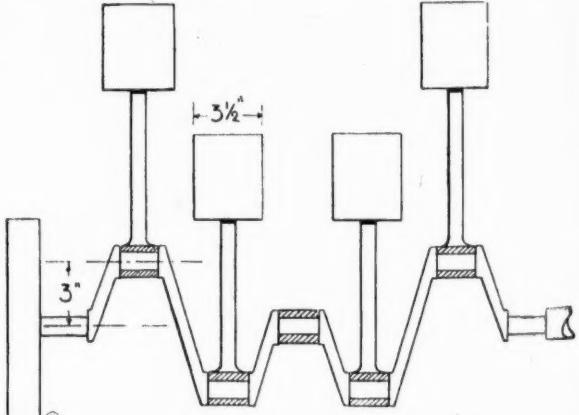
In the large engine the work done on each stroke of each piston will be the force of the expanding gas multiplied by the distance through which it acts. This is always true, that work equals force times distance. At the beginning of the power stroke, when the spark has fired all of the fuel, we have a maximum pressure, and as the piston moves down and the gas expands this pressure is reduced, so that we can not figure with the maximum pressure but must take an average value which we call the mean effective pressure or M.E.P. For these examples we will say the M.E.P. is 200 pounds.

In the large engine then, with pistons having 15 square inches of area, we will have a total force on the piston head of 15 times 200 or 3,000 pounds pressure. This force can then be considered as acting through a distance of 4", which is the stroke of the engine, so that the work done will be the force times the distance in feet. The stroke of 4" equals 1/3 foot, which multiplied by 3,000 pounds gives 1,000 foot pounds work done on each stroke.

When we figure the small engine we find that the pressure on the piston is two-thirds what it was on the large piston, for the area is two-thirds, so that the total pressure is 2,000 pounds. The stroke however makes up for the lack of area, so that when we multiply 2,000



*Fig. 1—In the short stroke engine the force exerted through the medium of the piston is greater but its effect is limited by the short stroke*



*Fig. 2—In the long stroke engine the force exerted is less but it acts through a greater distance; and with lighter parts, more strokes per second are possible*

pounds by  $\frac{1}{2}$  foot stroke we again get 1,000 foot pounds of work done at each stroke, so that, so far, there is apparently no advantage in either engine, but this is where our friend inertia, discovered by the deacon, begins to play a hand.

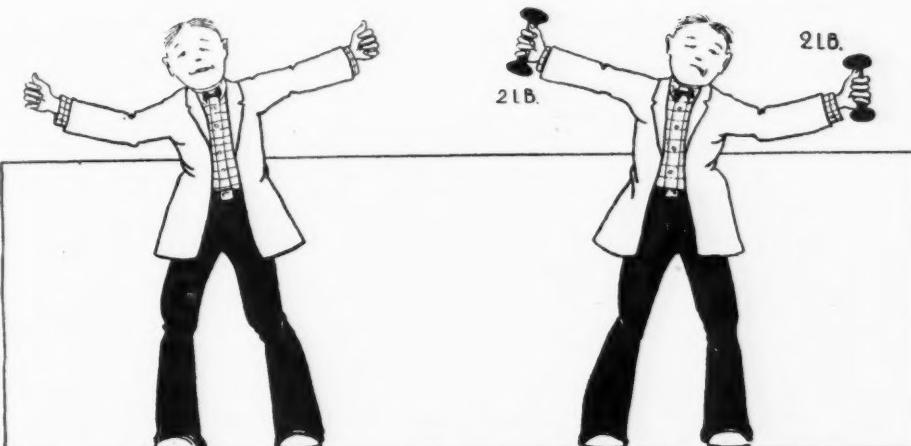
#### Reducing Exercises Compared With Engine Power

The action of the engine in moving its pistons and rods (hands and arms) up and down is much like a man taking his reducing exercises, except that the man moves his arms sideways. He finds that with nothing in his hands the exercise is easy, but that when he tries to do the same stunts with the two-pound dumb bells, that the old muscles start to complain. It isn't just the job of holding up the weights, although that has some effect, but it is the work of getting the dumb bells in motion and then suddenly stopping them again. It takes force to start them and just as much to stop them again.

The racing engine feels the same way about it and likes to have light weight pistons that can be stopped and started easily, for at racing engine speed of 4,800 R.P.M. the rods and pistons have to be started and stopped 160 times a second.

#### The Load the Bearings Carry

In figuring the work done at each stroke we found that the average force on the large piston was 3,000 pounds and of course this load is transmitted through the connecting rod to the bearing



*With nothing in his hands the exercise is more than easy*

*With the two-pound dumb bells the old muscles soon start to complain*

ing on the crank pin, but this is not the only thing that puts a load on the bearing, for, like the strain on the man's muscles in starting and stopping the dumb bells, there is also an enormous strain in stopping the piston and then starting it back the other way in the cylinder.

#### Taking Out the Jerks

In any motor car engine, the forces that propel the car are intermittent, while the motion of the car must be as steady as possible. A flywheel is therefore needed on practically any engine to store energy when the explosive force is greatest and, by its inertia effect, release

energy again in between strokes. Of course the more cylinders we have and the higher the speed of the engine, the less flywheel is required. In the small engines with light weight pistons and rods we can also see the reason for reducing the flywheel weight, for the faster the engine turns in proportion to the car speed, the more frequent are the power impulses. The advantage of the small high speed engine where rapid acceleration is essential is then easily seen, and such an engine with a light flywheel and light reciprocating parts will be able to get away from the turns, while the heavier engine would be getting its heavy parts in motion.

### Buffalo Has New Dodge Service Station



A. CRAMER, INC., Dodge Brothers motor car dealers, are erecting an addition to their present Main street building, consisting of three stories and basement, of fireproof construction, which when completed will extend their building through the entire block from Main street to North Pearl street. In addition to the building on the North Pearl street side there will be an open court or yard for the receiving of service work which will be 50 ft. wide and 75 ft. deep.

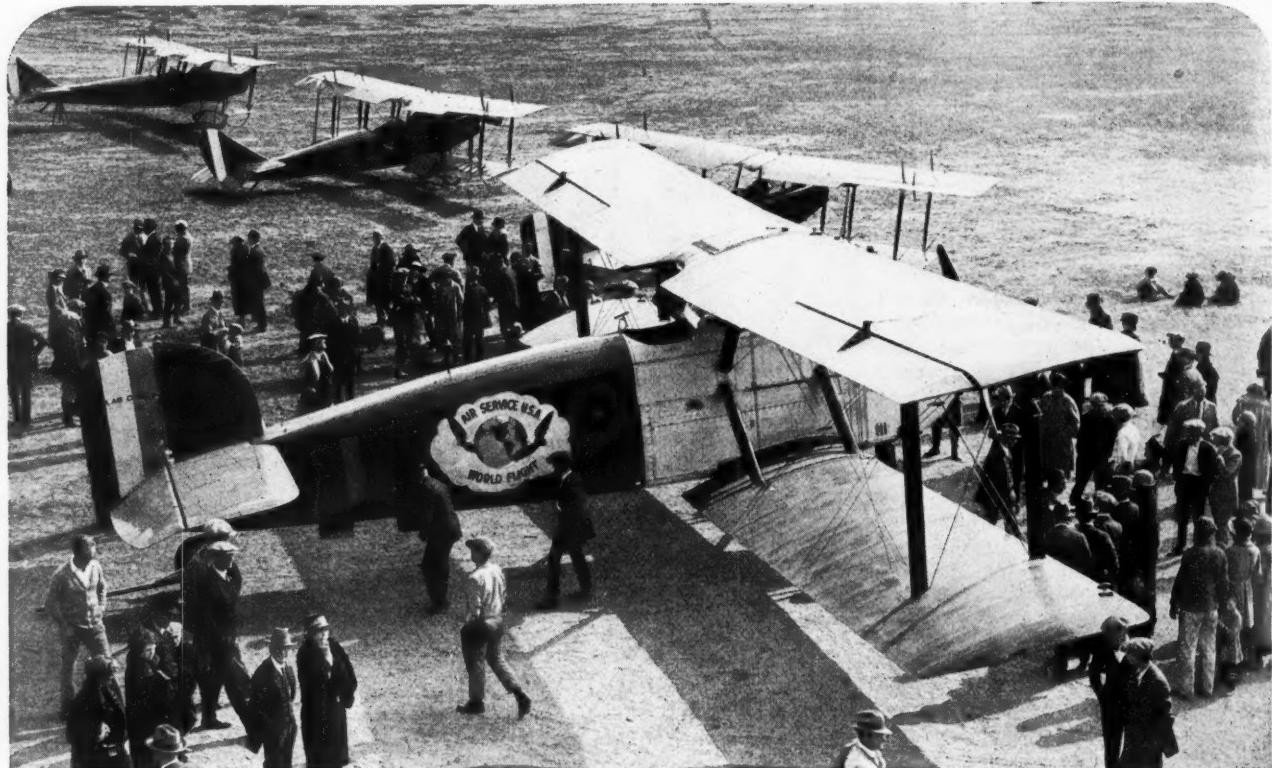
On completion of this building Mr. Cramer will have practically 52,000 square feet of floor space which will be devoted exclusively to the servicing of Dodge Brothers motor cars. The front on North Pearl street will be of cut stone and in every way be a duplicate of the Main street front, with the exception of the plate glass windows. On the side facing the court large steel bi-folding doors are used which are folded up against the ceiling, throwing the court into a part of the main floor of the building.

There are also wide entrance doors through the end of the building to North Pearl street. All of these doors will be electrically operated. The first floor will be used for quick service work, service manager's office and courtesy room which can be used by customers that are waiting for their cars.

This room will be well furnished with rugs, easy chairs, papers, books, telephone, etc. Mr. Cramer is anxious to service every one of the thousands of Dodge Brothers motor cars running in Buffalo and on completion of his new building he feels that he will be thoroughly equipped to do so, making the service the best that can be obtained anywhere.

Mr. Cramer's service station is oper-

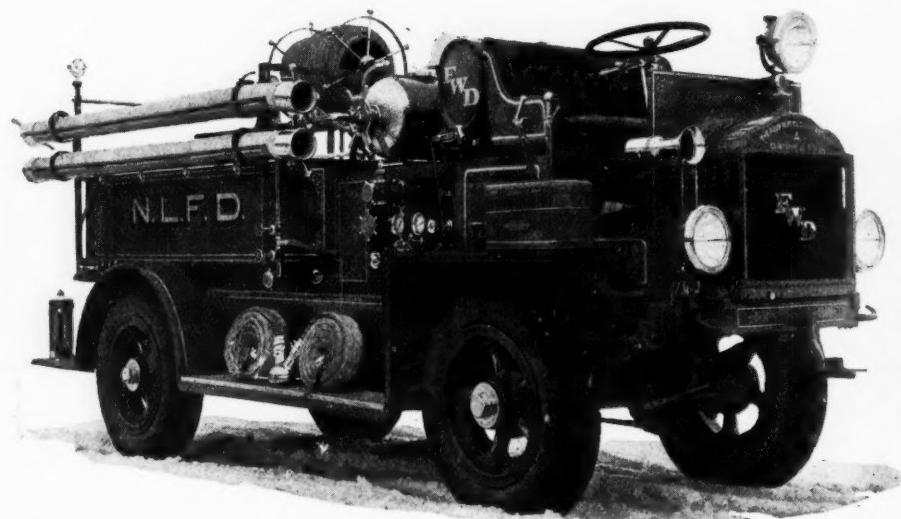
# MOTOR AGE'S PICTURE PAGES



*Getting ready for the take-off. The final of the around the world planes making ready for the flight which, in another few years, will be a regular thing*



*The New London, Wis., fire department. A big blaze on the night of Jan. 1 made the New Londoners see how necessary automotive equipment was in fire fighting. They bought this FWD truck then*

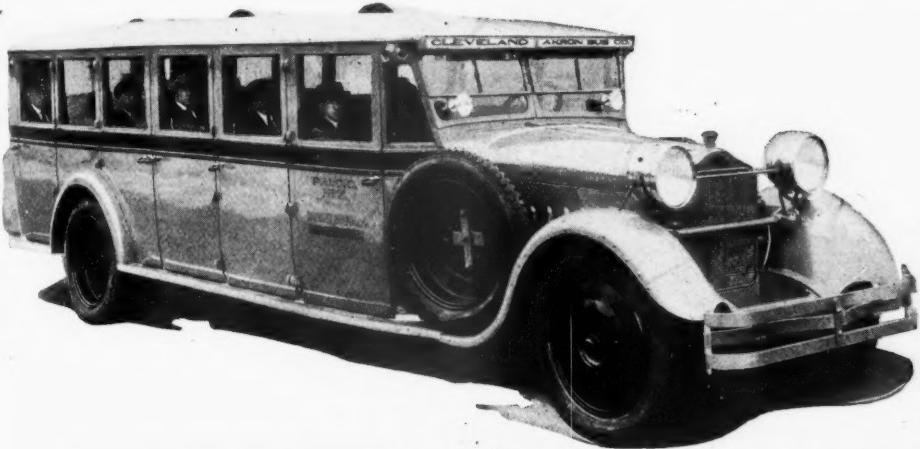


*Bad eyesight causes automobile accidents. The Massachusetts state department therefore made it necessary for folks wishing to get into accidents to take an eye examination*

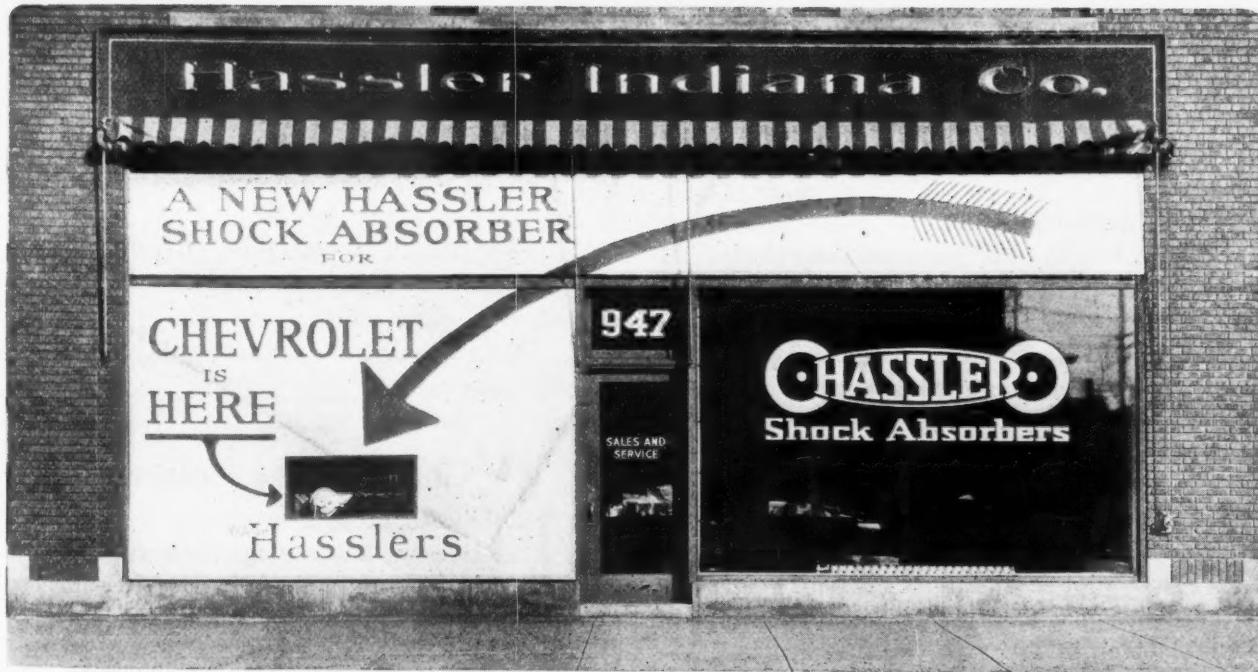


# S OF AUTOMOTIVE INTEREST

**School kiddies and safety.** In Los Angeles this plan for insuring the safety of school children was tried out. The gates are raised and lowered for pedestrians and traffic



*The White bus, newest coach of that company, is built for comfort and safety*



*For attracting attention. Like a spotlight on a stage is the effect of this white window with the small spot to display accessories, which otherwise would be "lost" in the vastness of the large space*

# MOTOR AGE

Reg. U. S. Pat. Off.

Vol. XLV

Thursday, April 17, 1924

No. 16

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J. E. Schipper, Field Editor	W. L. Carver, Field Editor		
C. G. Sinsabaugh, News Editor Warren Baker, Ass't News Editor D. M. McDonald, Detroit News			

Home Office, 5 South Wabash Avenue, Chicago  
Cable Address Motage, Chicago  
Telephone Randolph, 6960

## BRANCH OFFICES

New York City—U. P. C. Bldg., 239 West 39th St., Phone Pennsylvania 0080  
Detroit—7338 Woodward Avenue, Phone Empire 4890  
Cleveland—538-540 Guardian Bldg., Phone Main 6432  
Philadelphia—56th & Chestnut Sta., Phone Sherwood 1424  
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## A Profit Opportunity

**A** DEALER who proudly showed us his factory's latest model, a sport sedan equipped with balloon tires, double bar bumpers in front and rear, stop light, spot light, sun shade, radiator cap, engine temperature indicator and other articles, remarked that he was sorry the factory was putting so much on the car.

You see this dealer is an automotive merchant and for several years he has been putting nearly \$100 worth of additional equipment on 90 per cent of the new cars he sells. When he sells accessories that way he gets list price for them, which means a very nice profit considering an average discount of around 40 per cent. But when the car comes from the factory bearing all this additional equipment he gets as his profit on these accessories only the usual car discount on the additional price.

He is afraid that eventually the factory will turn out all its cars equipped as fully as is this model and he feels that when that happens he will be deprived of a considerable margin of profit from a nice business that he has built up for himself.

We are inclined to believe that after this dealer

studies his field thoroughly he will find that the more cars that are turned out fully equipped the greater will be the demand for similar equipment for addition to cars already in service. The demand may be slow in developing and it may require some sharp stimulation by means of well-directed sales effort, but we believe it will come. And the dealer who is keen enough to foresee it and prepare for it and get his share of the business will continue to profit from the sale of accessories at list price. The maintenance men, especially, will have a splendid opportunity to sell such equipment to the customer whose car is being reconditioned.

Then there will be a market for the replacement of accessories which come as regular equipment. Spot light and stop light mean more bulbs, and many other items are subject to breakage and damage requiring replacement.

The progressive automotive merchant will not be balked by reason of increased factory equipment, although he may consider it a little unfair to take such profits from him, but he will see in the factory's action a broadening of the profit field that he may cultivate.

## Passenger Car Price Tables

BEGINNING this week the specifications tables in MOTOR AGE are enlarged in a manner that greatly increases their usefulness to automobile dealers, salesmen and the trade in general.

New tables have been prepared showing in the most readable form the designation, price, weight and passenger capacity of each model of all the American makes of passenger cars. By preparing the tables in this form we are able to list the various models under the names given to them by their manufacturers. The passenger capacity and weight data enable convenient comparison with similar models of other makes.

The listing of the various cars this way, alphabetically by makes, will prove a wonderful convenience for our readers, most of whom have occasion to refer very often to the specifications tables. The price table will be corrected from week to week and every effort will be made to keep it up to date.

The mechanical specifications in tabular form will be continued and improved from time to time as ways are found to make them more useful to our readers.

You should make use of these improved and enlarged specifications tables.

## A Constructive Convention

MEMBERS of the Automotive Equipment Association are to be congratulated because of the closer contact which they are creating between manufacturer and retailer of automotive merchandise. It is significant that this contact is through the jobbers who are organized for the efficient distribution of the manufacturers' products to the retailer.

The recent spring convention of the Automotive Equipment Association at New Orleans was notable for constructive steps which should promote closer and better relations between manufacturers and their various distributing agencies. Probably the fact that both manufacturers and jobbers are members of the association on equal footing contributed to the broad-minded and fair attitude with which most merchandising problems were considered.

Upon invitation of jobber members, three retail dealers in automotive accessories and parts were brought before the convention to tell of their experiences in increasing their profits through the sale of accessories and supplies. This was a contact which was especially good for the manufacturing executives and the event showed in a most striking manner how well established are the channels for distribution of automotive merchandise from manufacturer to jobber and from jobber to retail dealer.

It showed also that the progressive manufacturer no longer considers his responsibility ended when he has sold the goods to the jobber, but that he is willing to join with the jobber in legitimate methods of helping the retail dealer dispose of his goods to the consumer. This, of course, is a long sighted policy for the manufacturer, for if the public did not buy his goods from the dealer he would soon find he could not sell them to jobber and dealer.

Many of these manufacturers are looking far enough ahead, however, to see that the dealer must make an adequate profit if he is to continue as a purchaser of their goods. Such manufacturers are responsible for the inauguration and support of the A. E. A. merchandising campaigns which were rounded out at this convention by the launching of a campaign on "Profitable Maintenance." The merchandising campaign was really the dominant feature of the convention, showing the eagerness and earnestness with which both jobbers and manufacturers are ready to promote the profitable sale of automotive merchandise and service.

The A. E. A. has provided a splendid medium through which its members may help retail dealers to sell more goods and at the same time make adequate profits. Manufacturers and jobbers attending the New Orleans convention indicated extraordinary willingness to make use of this medium and in this respect the convention probably was the most successful ever held by the A. E. A.

### When?

THE other day we received a letter from an accessory dealer which made us wonder about many things and mostly we wondered how he managed to still be in business. Four years ago we bought a tire from this man and left the address of our car's boarding house to have the tire delivered to. We knocked off plenty of miles with that tire and finally laid it to rest in a ditch in Kansas. It ceased to be a

part of the car about eighteen months after we bought it.

Even the car has been gone for a couple of years and yet we get a letter from this dealer in this year of the presidential election, 1924, reading in part: "Some time ago, we had the pleasure of selling you a tire which we hope has given you satisfactory service, etc., etc. \* \* \* Is it not now time that you thought of replacing that tire? We would be glad to have you call at our store and look over our new brands and balloons, etc., etc. \* \* \*"

We'll admit the tire was a good one, but we drive a car when we have one and drive it often and hard and no tire made will stand on our bus for four years. When will dealers learn to do their advertising when it ought to be done? And, when will they send letters to the right address, for this one was sent to the garage where we kept our car back in the pre-four wheel brakes days.

### Highway Pride

THE names of several automotive companies are included in a list of widely known business organizations which have decided to discontinue billboard advertising on public highways. They follow the very fine lead of Standard Oil.

Fourteen names recently have been added to the list of companies voting to adopt this course, according to Mrs. W. L. Lawton, who is directing a campaign against highway eyesores.

It is a most commendable movement and happily, indeed, it has taken fresh impetus. It may be expected that Mrs. Lawton's list will grow longer. Let it be hoped the extension will be generous and swift.

At the same time it should not be expected that these condemned billboards will disappear overnight. For the most part they have been erected on contract and will remain where they are until present contracts expire. But no new contracts will be negotiated, and as the signs come down it will be stay down. There will be no replacements. Gradually more and more daylight will be shed upon the highways and obstacles that conceal scenic splendors will vanish, one after another.

We are especially glad that the automotive trade is conspicuous in this movement, yet we all know full well that the automotive trade, as well as any other unit of the nation's industrial system, will gain rather than lose through its participation in the campaign.

America is striving to beautify her highways as well as the build better highways.

"Highway pride," therefore, is a very necessary thing to develop.

Establish "highway pride" and better and beautiful highways will follow in logical response.

Any American business institution that thrives upon the popularization of the public roads, and that includes all of them, can well afford to give its unstinted support to a movement of this character.

# Factory Schedules Depend Upon Sales

## Production to Hinge Much On Buying in First Half of April

### Expect Large Volume of Deferred Buying to Be Booked During This Month

NEW YORK, April 14.—Better reports of sales automobiles throughout the country are expected to follow the improvement in weather conditions. Because of a backward spring, many sections failed to develop in March the business that was anticipated for that month. Much of this deferred buying will be made up this month so April doubtless will justify the confidence reposed in it by dealers generally. Few dealers are but confident that the spring will prove to be strong from the selling standpoint.

Inasmuch as manufacturers followed exceptionally high schedules during the first quarter of this year in order to anticipate the spring demand, the slowing down in operations that is reported from the high level producers is not wholly unexpected. Schedules are being reduced from the high level of the first three months of this year in those plants that have been operating at capacity and will not be increased until April gives assurance that the expectations of the manufacturers will be realized.

#### Hinge On Sales Reports

Manufacturing programs for subsequent months will be governed in a great measure by the actual sales reports for the first half of this month. Producers are in a position to augment their schedules as soon as conditions in the retail field justify it but they will not proceed along lines previously followed if there is any indication that by so doing they will overload the market. Stocks in dealers' hands are not alarmingly large at present but they are sufficient not to warrant capacity operations on the part of producers until a strong buying movement has set in.

There is nothing whatever in the situation to cause apprehension. A year ago, with a comparatively light first quarter in the total output of motor vehicles manufacturers found themselves faced with a condition they had not expected; an unusually heavy buying movement had started and because of the light production there was not a sufficient supply of cars on hand to meet it. The result was that plant schedules were immediately increased so that in the second quarter the total output reached the record breaking figure of 1,155,290.

#### Year's Highest Quarter

That quarter was the highest of the four for last year, the third falling off to 1,000,744 and the last to 981,364. In the first quarter, output amounted to 875,503.

This year, manufacturers instead of

waiting for the demand to come and then catch up with it, exerted all efforts the first quarter to produce enough cars to supply the retail trade when the spring season opened. The result was that during the first quarter of this year 1,040,092 cars and trucks were produced, a total that exceeded every quarter of last year with the exception of the second. By maintaining high production schedules the first quarter, employment was given to labor during a period when it stood most in need of it. It is not expected now that production for the second quarter of this year will equal that for the same period a year ago.

## New Standard Relating to Keys Is Aimed at Automobile Thief

CHICAGO, April 14.—Convinced that a contributory cause of automobile stealing is the ease with which duplicate keys may be procured by unauthorized persons from manufacturers and dealers Underwriters Laboratories spent ten months seeking remedial measures. The result of the study was a new standard relating to duplicate keys. The standard provides that the change number of the locking cylinder must not appear on the face of the cylinder or in such a place that it will be visible to the thief.

It is pointed out that the thief who has been in the habit of copying off change numbers and ordering duplicate keys will find an obstacle in his way by the proposed numbering plan. This standard plan will become effective Jan. 1, 1925. On that date also a reclassification of automobile locking devices becomes operative.

The Laboratories urge that the trade require proof of authority of all persons applying for duplicate keys.

## Former Editor of Motor Age Now in Franklin Organization

SYRACUSE, N. Y., April 12.—Clyde Jennings, formerly editor of Motor Age and "Automotive Industries," has joined the forces of the Franklin Automobile Co. and will specialize on dealer development work under the direction of Vice-President F. E. Moskovics.

Mr. Jennings has had a wide experience in dealer development through his editorial connections and he enters this new field well equipped because of this and the many friends he has made among the retailers of motor cars in the last five years.

#### HERE'S NEW DURANT FOUR

NEW YORK, April 12.—The Durant Four is now to be marketed with balloon tires, four wheel brakes and steel disk wheels as standard equipment. The price will be \$940. This compares with \$890 which was the price without this special equipment. All specifications and details of the car remain as before.

## Los Angeles-Yosemite Run Will Be Staged May 16-17

### New Rule for Dealer Events This Year Complies With Law Against Coasting

LOS ANGELES, Calif., April 12.—The annual Los Angeles-Yosemite Valley Economy Run, participated in by cars entered by dealers, will be staged May 16-17. This run has become a national event. The ton mileage basis is used in arriving at results.

A change in the rules has been made for this year. No coasting will be permitted unless the motor is running and the transmission gears in mesh. This complies with a new state law against coasting, and at the same time makes the results of the run conform more closely to common driving practices. In the past it has been the custom for the wheel bearings on competing cars to be loosened, and operators coasted at every opportunity with the car out of gear and the engine dead. At one place on the road cars have been known to coast as far as twenty miles without any gasoline consumption. The route has been changed to avoid the famous ridge over the Tehachipi mountains. The law permits a speed not to exceed fifteen miles on the ridge and this is said to be too slow for economical driving.

Contesting cars will be in five classes, divided as follows:

Class 1-E—Four-cylinder cars costing under \$650 at factory.

Class 2-E—Four-cylinder cars costing from \$651 to \$2,000.

Class 3-E—Six-cylinder cars costing under \$1,200.

Class 4-E—Six-cylinder cars costing from \$1,201 to \$2,000.

Class 5-E—All cars costing \$2,001 and over.

Rules of the contest committee of the A. A. A. will govern the run.

#### MERGER PLAN RATIFIED

CHICAGO, April 12.—Final steps toward formal amalgamation of the American Automobile Association and the National Motorists Association were taken in Chicago yesterday. The long-discussed merger now is adopted as substantially an established fact, details only remaining for orderly attention. Committees representing each group met in separate sessions and agreed to go through with the unification program. The N. M. A. vote was unanimous, the committee finding disagreements only in minor matters relating to the draft of conditions which will be presented to the A. A. A. The final meeting will be held within 60 days and the merger officially affected.

## Figures Show What Backward Weather Did to Ford Business

### Sales During Last Ten Days About Equal Volume for All Rest of March

DETROIT, April 12.—In giving publicity to its retail deliveries in March, Ford Motor Co. is undertaking to clear away much of the skepticism that has arisen regarding the possibilities for automobile business during the year. The entire difficulty with the year to date has been caused by backward weather conditions, the company declares, and cites its figures to prove this.

The total sales during the month were 205,735 and the average sales for the last ten days were 10,804. This means that in the ten-day period more deliveries were made than in all the rest of the month. Weather conditions alone made the last ten days show this vast improvement over the early part, the company declares, and even in this period there were only a few days that were really spring-like.

With a continuation of good weather for a few weeks in a row, the company estimates that daily deliveries might well reach close to the 15,000 mark and it is looking with confidence to April deliveries showing a total of 300,000 cars and more. With buying reaching these proportions, stocks in dealer hands would be quickly depleted, and despite capacity operation of the factory would cause delivery delays to buyers.

### ABSORBS HUCK SALE

WILKES-BARRE, Pa., April 12.—The Huck Axle Corp., of Chicago, has been absorbed by the Sheldon Spring & Axle Co., according to a formal announcement made by the Sheldon company, and the Huck double reduction axle will be manufactured by the Sheldon company under Huck patents and the direct supervision of L. G. Huck, who now is affiliated with the Sheldon company.

The Huck corporation's equipment will be absorbed by the Sheldon company and the corporation itself go out of existence as an operating company. The Huck brake, it is stated, will eventually be put on the Sheldon truck axles, its distinctive feature being its floating two-cam principle of operation. The cams are so arranged as to be automatically self-adjusting for concentricity with the brake drums.

### COMMITTEE APPROVED

NEW YORK, April 12.—Directors of the National Automobile Chamber of Commerce at their monthly meeting approved the balloon tire committee as named by President Charles Clifton. On this committee are Alvan Macauley, Packard, chairman; H. H. Rice, Cadillac; O. C. Hutchinson, Hupp, and Robert C. Rueschaw, Reo. This committee is directed to investigate the balloon tire situation from the viewpoint of the car manufacturers.

### AFTER AUTOMOBILE THIEVES

CHICAGO, April 11.—Co-operation of automobile dealers in a campaign against automobile thievery is asked in a bulletin issued by the Chicago Motor Club. When a dealer takes in an old car at an extremely low figure, the bulletin says, he has cause to suspect something shady has taken place and he is asked to promptly report all such purchases.

Records of the club show that Chicago motorists are being relieved of machines at the rate of from five to ten a day.

### Hoepli to Step Out as Acting Chief of Automotive Division

### Well Known Government Attache Joins General Motors European Branch on May 1

WASHINGTON, April 12.—The resignation of M. H. Hoepli, for more than a year and a half acting chief of the automotive division of the United States Department of Commerce, is expected very soon. Effective May 1, Mr. Hoepli will go with General Motors to assist in their European sales program. He will spend three or four months in the company's Detroit offices before going abroad.

Mr. Hoepli became affiliated with the Department of Commerce on October 1, 1921, serving in the capacity of assistant chief of the automotive division, under Gordon Lee, until the time of Mr. Lee's resignation, when for about 19 months he carried on the work of the department until the appointment of the new chief, Percy Owens, last month.

Prior to his connection with the department he was with General Motors Corp., research division, from August, 1920, to October 1, 1921, being actively affiliated with the General Motors Acceptance Corp. and the General Motors Export Corp. in New York. He gained his initial automobile experience in the introduction of foreign cars into Switzerland.

### REVISE STOCK PLAN

NEW YORK, April 12.—The annual meeting of stockholders of the Studebaker Corp. after reelecting all the old directors, who in turn reelected the officers, approved the plan for splitting common shares of \$100 par into no-par common on the basis of two and one-half new shares for one of old. A total of 2,500,000 no-par common shares was authorized. There will be issued in exchange for the 750,000 common shares of \$100 par, 1,875,000 no-par shares. The remaining 625,000 will be held in the treasury to be issued at the discretion of the directors.

### \$20,000,000 FOR ROADS

COLUMBUS, O., April 12.—Approximately \$20,000,000 will be spent in construction of new roads and highway maintenance work in Ohio during the next ten months, according to George F. Schlesinger, chief engineer of the state highway department.

### Adopt Truck For Less Than Carload Hauling In Gotham

### Three Months' Study Convinces New York Central It Can Use Motor Cars Profitably

NEW YORK, April 12.—After three months' intensive study and trial of the motor truck as a replacement unit for the transportation of freight in less than carload lots destined for unloading in the congested New York City district, the New York Central Railroad has set its stamp of approval on this method of freeing freight cars for other service by using trucks for all less-than-carload lots of freight coming into New York City and points east of Buffalo.

Following the inauguration of this service on the Harlem side of the electric division on January 28 and on the Hudson side of the same division February 11, the New York Central has followed this up by establishing five trucking zones in western New York in what is known as the second district of the New York Central Railroad, namely, Syracuse, Newark, Rochester, Medina and Buffalo.

The method is similar in principle to that employed on the electric division; that is, less-carload freight is handled by trucks from the above mentioned points to various nearby stations, the trucks picking up freight at the intermediate stations for points beyond and, returning, handling freight for intermediate and zone stations. The trucking is handled by a contractor, the equipment varying from one truck at Syracuse, making 64 miles daily, to 28 tractors, trucks and trailers at Buffalo, averaging 530 miles daily.

The New York Central states that motor truck service to replace local freight train service will shortly be established at such other points where surveys will show that such service can be operated profitably and give shippers the requisite service, and that surveys are under way preliminary to the extension of the plan in other territory.

### GARAGE OWNERS ORGANIZE

CHICAGO, April 12.—A delegation of 15 officers and directors of the Chicago Garage Owners' Association went to Milwaukee the night of April 3 to assist in organization of the Milwaukee Garage Owners' Association. Robert Bland, business manager of the Chicago organization introduced the members of his party who gave brief talks on various departments of organization.

Among the subjects discussed were insurance, legislation and a number of other topics current with garage owners. More than 40 members were registered the first night by the Milwaukee association and the following officers were elected: President, Michael Erts, 532 Jefferson street; vice president, Archie F. Lorenz, 59 Oneida street; secretary, William F. Sanger, 485 Jefferson street; treasurer, W. J. Bertha, 551 Donner street.

## Willys Presents Impressions Gained on 10,000-Mile Trip

**"Saturation Point" Called "Vague Bugbear" by Company Head Before Dealers' Conference**

MILWAUKEE, April 14.—Impressions concerning the immediate future of passenger car business gained from a 10,000-mile trip, lasting 25 days, in which contact was made with more than 3,000 distributors and dealers of the United States, were recounted by John N. Willys, president, Willys-Overland Co., Toledo, at a conference of 250 Overland and Willys-Knight dealers of Wisconsin in Milwaukee, under the auspices of the Overland Wisconsin Co., state distributor.

"There is little need for the automotive industries to be affected by that vague bugbear, 'saturation point,' and this year will see all manufacturing and selling records broken," said Mr. Willys. "There is going to be good business for concerns which have quality products and produce real service. Conditions may be more competitive, but there is plenty of business everywhere if one goes out after it."

### 300,000 Cars for 1924

"We aim to build 300,000 cars in 1924, and we have made a splendid start. We have broken last year's record so far and our production has passed 1,000 a day. In April we expect to turn out 30,000 cars.

The coming twelve months will be the most vital period in the history of the industry. There is a simmering down taking place by which manufacturers and dealers alike are being subjected to the test which determines the survival of the fittest. Only those whose business methods are abreast of the times will survive. Today 90 per cent of the business is done by 12 concerns."

### A Staple Product

Concluding, Mr. Willys said automobiles are a staple product, a fundamental need and a strict necessity, and there is no greater danger of a "saturation point" than in the sugar or flour industries.

Milwaukee was the last stop of Mr. Willys before returning to Toledo from his long swing around the circuit of the states. He was accompanied by L. G. Reed, general sales manager, and Ward M. Canaday, director of advertising.

### TO STANDARDIZE PRODUCTS

DETROIT, April 6.—The Trailer Manufacturers' Association has decided to standardize its products so far as possible, and with that idea in mind started gathering blueprints and specifications from manufacturers of axles, springs and wheels to determine how reductions may be made in the number of types and sizes of these parts. This is only the preliminary step to a general standardization that will be attempted.

In order to facilitate teamwork along standardization and simplification lines, the association has decided to admit companies making trailer parts to associate membership.

## Fifth of Firestone Tires Balloons

AKRON, O., April 12.—While official figures are not obtainable, it is reported reliably that almost 20 per cent of the 26,000 tires made daily by the Firestone Tire and Rubber Co. are of the balloon type and that the facilities for the production of this type of tires is being constantly increased.

With Firestone, the largest balloon tire builder, making in the neighborhood of 5,000 balloon tires a day, it is estimated by other authorities that the daily balloon tire production must be closer to 10,000 daily than to the 7,000 a day estimated some time ago.

## To Double Capacity of Ford Assembly Plant at Hegewische

CHICAGO, April 12.—In existence only since last January, the assembly plant of the Ford Motor Company at Hegewische, a Chicago industrial district, is to be doubled in size as soon as the feat can be accomplished. Contracts for the additional construction have been let and actual building will be commenced in a short time.

It was announced when work of construction on the first half of the future Hegewische plant was commenced that provision was made for extensive expansion. How far the expansion program will be carried remains for developments, but with 70 acres already acquired and large areas available, Ford will not be stopped for the want of ground space. The present Hegewische establishment covers something like sixteen acres. It is along the Nickle Plate right of way.

From 3,000 to 3,500 men are employed by Ford at present at the Hegewische plant. They work in three shifts. With the plant doubled in size the working force and output may be expected to become proportionally larger.

## DePalma Will Not Be Entered In Indianapolis Speedway Classic; Not Now Member of A. A. A.

INDIANAPOLIS, Ind., April 12.—Ralph DePalma will not drive in the Twelfth International 500-mile automobile race to be held at the Indianapolis Motor Speedway, May 30.

This definite announcement has been made from the speedway office.

DePalma will not ride at Indianapolis, it was explained, because he is not now a member of the American Automobile Association, the governing body of the gasoline sport, under whose rulings and jurisdiction the Indianapolis affair and all other championship events are held.

Ralph, a favorite with fans in victory

## Master Truck in Hands of New Manufacturing Company

**C. C. Smith Heads Organization Which Will Operate Plant Formerly Run by Rosenfields**

CHICAGO, April 11.—Application for a charter of incorporation has been filed by the Master Motor Truck Manufacturing Company, a new concern, which has taken over the physical properties, trademark and good will of the Master Motors Corporation, 2381 Archer avenue, Chicago. The purchase means the stepping out of the Rosenfield brothers as truck and bus manufacturers and the advent of a new business association.

M. S. Rosenfield was president of the Master Motors Corporation. While formal organization is to be worked out by the new company, it is said C. C. Smith will serve as president and general manager. Mr. Smith is a widely experienced truck builder, having been steadily at it since he had a hand in constructing the Randolph truck, which flourished years ago, to be subsequently taken over by G.M.C., and put on the shelf. Theo. B. W. Zumstein, well schooled in truck merchandising, will be in charge of sales. He will be assisted by "Bob" Crowthers, who also will handle the advertising.

The Archer avenue plant has capacity for 174 trucks a month, which should meet the company's requirements for some time to come. The company will continue production of heavy service trucks and buses. Fiscal details related to the organization will be announced later.

### BIG CLAIM CANCELLED

DETROIT, April 12.—The Security Trust Co., receiver for the Republic Truck Co., has received unofficial advices that the government claim of more than \$400,000 against the estate of the Republic company has been cancelled and that in addition a refund of \$50,000 for over-assessment is to be made. Of this amount of \$50,000 approximately 25 per cent is due the Republic estate, the balance going to the Torbenson Axle Co., of Cleveland, at one time a Republic subsidiary.

and defeat, has not won a championship event in years. To wipe out the dollar deficits of years of racing losses, it is said, he accepted during the winter a real Babe Ruth contract from the promoters of a dirt track in California, and was thus automatically disqualified from participating in recognized and organized speedway racing.

It will be the second time DePalma has been absent from the International race. In 1916, the year after he won the classic, he failed to enter within the prescribed time. His post entry was refused a month before the race. Dario Resta won the event.

## Plan Interesting Program For Big Detroit Gathering

**Recognized Authorities on Many Topics of Trade Interest Are Scheduled for Addresses**

NEW YORK, April 12.—Each afternoon of the four days of the National Automotive Service Convention, which is to be held in Detroit May 19-22 under the auspices of the National Automobile Chamber of Commerce and co-operating organizations, will be devoted to addresses by recognized authorities on various subjects of interest to service men. There will be three a day and all of them will be illustrated.

As announced by Chairman F. A. Bonham of the N. A. C. C. Service Committee, who will preside at the meetings, the program will be made up as follows:

Monday, May 19

"What the Public Is Entitled to Receive from Service Men," by Frank R. Tate, Frank R. Tate, Inc., officially representing the National Automobile Dealers' Association.

"Selection and Training of Mechanics," by J. C. Wright, director Federal Bureau of Vocational Education.

"Shop Layout and Selection of Proper Tools," by E. M. Young, advisory staff, General Motors Corp.

Tuesday, May 20

"How to Properly Fit Pistons and Bearings," by D. Andrews, service manager, Continental Motors Corp.

"Proper Adjustment of Rear Axle, Gears and Bearings," by Colonel H. W. Alden, past president of the Society of Automotive Engineers and chairman of the board, Timken-Detroit Axle Co.

"Adjustment of Brakes," by F. C. Stanley, Ph. D., chief chemist and service engineer, Raybestos Co.

Wednesday, May 21

"How the Service Man Can Co-operate with the Engineer," by H. M. Crane, president, Society of Automotive Engineers, and technical assistant to the president, General Motors Corp.

"The Effect of Heating Alloy Steel Parts—the Proper Way to Repair," by L. A. Danse, chief metallurgist, Cadillac Motor Car Co.

"The Effect of Poor Lubrication," by Dr. W. K. Lewis, head of the Department of Chemical Engineering, Massachusetts Institute of Technology, and chemical consultant, Standard Oil Co.

Thursday, May 22

"Selling Service," by Carl H. Page, director of sales, Durant Motor Co. of New Jersey.

"Simple Accounting System," by C. R. Comfort, president, Comfort Printing Specialty Co.

"The Electrical System Explained," by G. R. Fessenden, North East Electric Co.

### MERGER APPROVED

NEW YORK, April 12.—Ratification of the deal whereby the Gurney Ball Bear-

## Claims Championship as Motor County

CRESCO, Ia., April 12.—Adams County, Ia., claims the banner automobile ownership of the nation with 1.61 cars for every family, while only 20 counties of 99 in the state have more families than automobiles.

In the tier of northeastern counties the automobile ownership runs high while it is noticeable that the river counties have the lowest per capita ownership.

In 13 counties in this tier there are 59,498 cars and 57,050 families, while only three counties in the group have fewer automobiles than families.

ing Co. becomes a division of the Marlin-Rockwell Corp. has been followed by an election which places Henry K. Smith, former president of the Gurney company, in the presidency of the Marlin-Rockwell Corp. The election resulted in seven Gurney and five Marlin-Rockwell executives being named as directors of the new board.

The new combination starts in with bright prospects, the merger having brought in capital which has enabled the Marlin-Rockwell Corp. to pay off its syndicate loan of \$1,100,000, leaving it in a strong position, with only a comparatively small amount owing to trade creditors.

Under the new plan Marlin-Rockwell and Standard Steel & Bearings, Inc., will operate their plants at Plainville, Conn., the latter making balls in addition to S. R. B. bearings. Gurney will make Gurney bearings at Jamestown, N. Y.

### USE SEAL AS PROTECTION

ST. LOUIS, Mo., April 12.—Weber Implement and Automobile Co., Hupmobile distributor in St. Louis, has adopted a seal for the tappet and valve housing of motors on which its shop has performed a valve-grinding and tappet adjusting operation. Customers have been in the habit of having such work done elsewhere, and if it goes wrong, coming into the Weber shop with complaints. The seal, according to officials of the Weber company, will prevent this practice. The seals are made of lead and resemble those used on freight car doors.

### COURTLAND BABCOCK DEAD

KALAMAZOO, Mich., April 12.—Courtland Babcock, president and treasurer of the Babcock Automobile Spring Co., Milwaukee, died March 26 and was buried in Kalamazoo, Saturday, March 29. Mr. Babcock was a native of Kalamazoo, his family being very prominent during that period 1860 to 1880. Mr. Babcock was a Rotarian and a member of the Isaac Walton Club.

## Think Tire Production Due Curtailment in Near Future

### Manufacturing Pace Around Akron Higher Than Estimated Consumption Next Three Months

AKRON, O., April 12.—That some curtailment in the rubber automobile tire industry will take place during the next three months, perhaps during the next month, unless the unexpected happens, is now believed by some of the most thoroughly informed authorities in the district.

The pace of production has been somewhat higher than the estimated demand for the next three months and while official information is not available here it is reported on good authority that a curtailment in production of automobiles is to be expected during the month with natural consequent reduction in demand for original equipment tires.

It is possible that the coming of excellent motoring weather during the present month will stimulate tire sales more than is now anticipated, but even if production is not curtailed, due to such unexpected increase in demand, it seems certain that no increases in output will be registered during the present year with the exception of isolated instances and for the most part by the smaller companies.

This does not hold for balloon tires however, it is stated, because the demand for this type of tires is now such that it is impossible for many of the factories to fill their orders in spite of the fact that increases in production are being made as rapidly as equipment is made available.

### RADIO FOR DULL MONTHS

MILWAUKEE, Wis., April 12.—Six of the largest automotive electrical dealers and service concerns in Milwaukee have organized the Radio Corp. of Wisconsin, which has established headquarters at 436 Milwaukee Street, and will do a wholesale distributing business in radio equipment exclusively. Its announcements says in part:

"We believe that radio is the logical outlet for automotive dealers to stop the gap in business during the dull winter months. Radio can turn your losing months into profitable months. It brings hundreds of people to your establishment who can be turned into car prospects and service shop customers. Radio will become a tremendous business. If you expect to get your share, you must start right now and grow up with the business."

### BIGGEST FEBRUARY

AKRON, O., April 12.—President J. M. Alderfer of the India Tire and Rubber Co. reports officially that business during February was the largest in the history of the company with production in excess of 800 tires a day and that operations during the first quarter as a whole were very satisfactory.

# Automotive Exports on Stable Basis

## Merchandising Field Across Sea Described by U. S. Expert

### Says True Future of Industry Lies in Undeveloped Regions in Distant Lands

ST. LOUIS, Mo., April 12.—Speaking before the Central Mississippi Valley Foreign Grade Conference, Percy Owen, chief of the automotive division of the United States Department of Commerce, outlined to the delegates the possibilities of automobile manufacturers in the export field, talking on "Opportunities for Americans in Foreign Automobile Markets."

Exports of automotive products, he pointed out, were \$170,000,000 in 1923, which were four times as great as the 1913 exports and half as much again as in 1922. The automobile industry is devoting constantly greater attention to maintaining its export business, the speaker said. Comparing last year's exports with production in 1895, the speaker said that in 1895 there were 300 vehicles produced and none exported, while last year there was a total production of more than 4,000,000 vehicles, counting Ford foreign assemblies, of which more than 300,000 automobiles and trucks were exported, the ratio to production being about 8 per cent.

#### Annual Ratio Will Grow

The annual ratio, the speaker declared, will grow larger and larger, predicting that foreign sales of 500,000 cars a year "would be no more visionary than a 4,000,000 car production was in the beginning of 1923.

"In 1921 the safe and sane development of American export trade in automobiles really began. We are now on a stable basis and the future looks definite," the speaker said. "In that year the United States and Canada shipped abroad 50,000 cars and trucks; in 1922, the exports grew to 115,000; in 1923, to 225,000. These figures tell, better than anything else, the story of our growing exports. It must be remembered also, that these figures do not include Ford foreign assemblies, which add to the total for the three years 200,000 cars.

"The capacity of our factories may outstrip our domestic demand. Then we must look to foreign markets. They can, and will stabilize this great American industry. If the automobile industry is to remain prosperous and continue so, its rate of growth having made it one of the marvels of the modern world, that 8 per cent ratio of exports must be increased. The true future of the American automobile lies in these undeveloped regions where it alone can penetrate."

The speaker then outlined the work of the automotive division of the United States Department of Commerce.

## Ox-Carted India Needs Motors

CLEVELAND, O., April 12.—Belief that India possesses potentialities for sales of motor car products greater than any other country, was voiced here by Percy Owen, chief, automotive division, Department of Commerce, in an address on "The Automobile Market in India," delivered before the Cleveland Chamber of Commerce.

The speaker made the striking observation that "India is today like the United States was in 1900.

"In its hundreds of millions of people, many of them, true enough, ignorant as to reading and earning but a pittance, India has great potentialities. Every year a million or more go by ox-cart or walking, to Benares on the Ganges, to bathe in the muddy water; 800,000 have gone to Allahabad in a single week. Thousands who work in industry go back to their farms to plant and again to gather the crops, many traveling 1,500 miles in each direction, part of the way in trains, but largely walking.

"Can't you visualize that situation? Then can you see that American truck and its trailer doing more than the work of 35 two-ox teams with 35 drivers? Can you tell me India is going to be satisfied with ox teams forever?"

## Nearly All Cars Imported By Argentina From U. S. Shippers

WASHINGTON, April 12.—Out of 8,640 passenger cars imported by the Argentine republic during 1923, 8,164 of them came from the United States, the automotive division, Department of Commerce, announces, following the receipt of official cable dispatches from Buenos Aires. These imports, it is stated, increased steadily month by month, reaching 283 in January, 555 in July and 1,086 in December.

The figures do not include imports of a leading low-priced American car.

The figures for 1923 were almost 100 per cent greater than for 1922.

## SHOW INDUSTRY'S VALUE

WASHINGTON, April 12.—Progress of the value of the French automobile industry over a period of ten years is reflected in exports figures made public by the United States Bureau of Foreign and Domestic Commerce. The figures follow: 1913, 227 millions of gold francs; 1919, 125 millions of paper francs; 1920, 884 millions of paper francs; 1921, 666 millions of paper francs; 1922, 557 millions of paper francs; 1923, 812 millions of paper francs.

## Shipments Abroad Attained Higher Levels In February

### Second Month's Volume of Business for Other Countries Million Dollars Above January

WASHINGTON, April 12.—After setting a record-breaking pace in January, American automotive exports arose to even higher levels in February, it has been announced here by the automotive division of the United States Department of Commerce.

The total value of the shipments from the United States in February was \$19,566,226, a million dollars more than the \$18,465,202 value of January.

In the face of this general advance, the shipments of passenger cars and trucks receded slightly from the January mark, due chiefly to reduced exports from Canada.

The small extent of the decrease, however, is shown in the ratio of exports to production, which dropped from 9.7 per cent in January to 8.3 per cent in February. Salient developments of the month included large increases in the shipments of engines, parts, motorcycles and motor boats, which more than counter-balanced the lessened exports of passenger cars and truck. Production of vehicles was more than 50,000 units greater in February than in January.

## ACCESSORY MARKET

WASHINGTON, April 12.—That the absence of distributors of American automobile accessories in China is keeping back an otherwise natural increase in the sales of American products is explained by Vice Consul Granville Woodward, Tientsin, China, in a cable received by the Automotive Division, U. S. Department of Commerce. "There is some complaint," explains the vice consul, "among local firms that there are no distributors of American automobile accessories, although at least two American firms state that they carry a complete stock of repair parts. Any firm which maintained sample stocks at a central distributing point in China and could supply local houses without delay would increase the sales of American products considerably."

## SALES GOOD IN CHILE

WASHINGTON, April 14.—Sales of automobiles and particularly of high-priced cars are good in Chile, Commercial Attaché R. H. Ackerman has just advised the Department of Commerce, although "some dealers complain of reduced sales on account of the adverse exchange market." Mr. Ackerman reports that sales of trucks are slow and the Santiago market is saturated with this product.

# Reports Show Tone of Foreign Markets

## Opportunity For U. S. Motor Merchants In Alsace-Lorraine

### Vice Consul Woods Sees Chance In Strasbourg District for American Selling Company

WASHINGTON, April 12.—Possibilities exist for the sale of American made automobiles in Alsace-Lorraine, according to advices received from Vice Consul Leslie E. Woods at Strasbourg, and just announced by the automotive division of the Department of Commerce. Statement is made that there are not more than 100 American passenger cars in the Strasbourg district, but more could be sold at Strasbourg City if an active selling company were conducted. At present foreign cars dominate the market.

"Of the American cars now in operation," advices continue, "a considerable number were war stock; several were valued at over \$3,000, a like number of the \$800 and \$2,000 class, and a larger number of a low price market. The cheapest of these cars cost about 40 per cent more than the German-made Mathis and pays much higher taxes. The principal objections to American products are their first cost due to import duty and adverse rate of exchange; their high annual taxes, owing to high power; comparatively greater fuel consumption and difficulty in obtaining spare parts."

### FRENCH CASING EXPORTS

WASHINGTON, April 6.—Approximately 120,000 automobile and motorcycle casings were exported from France during January, 1924, it was announced here this week by the United States Department of Commerce following receipt of official statistics from Commercial Attaché Chester Lloyd Jones, Paris. French exports of rubber goods amounted to 1,960,900 kilos valued officially at francs 63,413,000. Attaché Jones remarks, however, that official valuation is not reliable as it is an arbitrary valuation not based on invoice values.

The leading tire markets, the dispatches state, were Great Britain, 348,800 kilos; Belgium-Luxemburg, 217,000 kilos; Spain, 137,600 kilos; Switzerland, 121,200 kilos; United States, 114,800 kilos; Brazil, 87,600 kilos; Argentina, 54,800 kilos; Algeria, 58,200 kilos; Morocco, 36,800 kilos; Netherlands, 34,900 kilos; Italy, 33,900 kilos, and French Indo-China, 31,800 kilos. Of the total weight of exports, 1,671,100 kilos consisted of rubber tires.

### TO HANDLE FREIGHT

MEMPHIS, Tenn., April 12.—In March the Valley Transportation Co. inaugurated a freight hauling service on regular schedule between Memphis, Tenn., Cleveland and Boyle, Miss. J. L. Baker is manager.

## Venezuela Gives 99 Per Cent to U. S.

WASHINGTON, April 12.—Underselling all other foreign cars, American automobiles account for probably 99 per cent of the 4,000 vehicles now in use in Venezuela, Vice Consul Anslinger at LaGuaira cabled the Department of Commerce this week.

The consul states that "motor truck transportation, which requires greater development, offers perhaps the largest potential opportunity in the country."

The cable concludes by saying "the high cost of gasoline, which is now 80 cents per gallon, is a deterrent factor in the market."

## Lack of Improved Highways Checks Truck Around Tientsin

### Heavy Machines Practically Barred. Types Up to Two Tons Being Best Bets

WASHINGTON, April 12.—Lack of improved roads is limiting the use of trucks in the Tientsin district of North China, according to advices received at the automotive division, Department of Commerce, from the American representative in this consular district. The advices continue that "heavy machines are practically barred, and what increase occurs for some time to come will probably be in one and one-half and two-ton types."

It is estimated that about 2,500 automobiles and 60 motor trucks are in use in the Tientsin district, the principal cities of which are Pekin and Tientsin.

"The Chinese Maritime Customs," the advices continue, "gives the imports of automobiles into Tientsin for 1923 as follows: United States, 159; Germany, 17; Italy, 8; France, 57; Great Britain, 12; Denmark, 10; Holland, 9; various other countries, none. The 159 cars imported by the United States in 1923 shows an increase of 44 cars over 1922."

### PLAN INTERNATIONAL SHOW

WASHINGTON, April 6.—The German Automotive Dealers Association, in cooperation with the Allgemeinen Deutschen Automobil-Club in Munich, is planning to hold the first post-war international automotive exposition during February or March, 1925, according to Trade Commissioner Arthur J. Grey at Berlin in a cable to the Department of Commerce. He adds that the same association has decided to promote an international automobile race during May, 1925, and that both events will probably be held at Leipzig.

## Predicts Tractors Will Take Horses' Place In Lumber Camp

### American Consul in Ontario Tells of Interesting and Successful Experiments With Motors

WASHINGTON, April 12.—Prediction that the horse will surely and very soon be displaced in the various lumbering and timber camps in the Ontario section of Canada by the tractor is transmitted to the Automotive Division, Department of Commerce, in a dispatch received from Dudley G. Dwyre, American consul at Fort Williams and Port Arthur, Ontario. "Both the light and heavy tractors will come into favor," says the advices. "One timber contractor in the Ontario district has introduced into his lumbering and logging operations a light American tractor equipped with crawling apparatus of the track-laying type and, in his recent experiments, has been vastly surprised with its performance. This small tractor, with one man, does the work of five teams with five men."

"The practicability of the use of the large tractor in timber and logging operations has been demonstrated by one large firm of manufacturing lumbermen at Chappleau, Ontario, about 380 miles east of Fort Williams, on the Canadian Pacific Railway. This company is using at present a large 10-ton tractor of American manufacture, of the caterpillar type, which is constructed in such a way that a heavy flexible steel frame is carried over the tractor upon which a load of logs, pulpwood or any other material can be placed to give added tractive power when hauling a load."

"The president of the company states that his company has found this machine exceptionally successful in its log-hauling operations this winter. The one tractor replaced fifteen pairs of horses and their drivers. It requires two men to operate the tractor, a motorman to handle the machine and a lineman to couple up the train of sleighs and supervise it."

### NEW CAR SALES MAY DROP

WASHINGTON, April 6.—Unimproved economic conditions and an overstock used car market will probably cause the sale of new cars in New Brunswick, B. C., to drop off somewhat during 1924, it was announced here this week by the Automotive Division, United States Department of Commerce.

Point is made, however, in the announcement that the market for automobile parts and accessories may not be affected to the same extent. The total registrations in the province at present do not exceed 17,000 passenger cars and 11,000 motor trucks, with an average increase of approximately 2,000 cars per year.

## Biflex and Halladay Merge Bumper Producing Interests

**Factories at Waukegan and Decatur,  
Illinois, Will Be Retained As  
Separate Units**

CHICAGO, April 9.—Announcement is made of the merging of the Biflex Products Co., Waukegan, Ill., and the L. P. Halladay Company, Decatur, Ill. This merger establishes what is said to be one of the largest automobile bumper manufacturing organizations in the world.

The Biflex bumper and those that have been produced by the Halladay company are well known to the automotive industry. The two lines, it is said, will be retained practically intact as they do not conflict from a sales standpoint and the two plants will be operated as separate units.

This arrangement also contemplates more simplified buying and marketing and a higher rate of general efficiency. Production capacities at both Waukegan and Decatur factories are being greatly enlarged.

Biflex officers are: W. G. Pancoast, president; L. P. Halladay, vice president; W. G. Grotenhuis, vice president; W. E. Ericson, vice president and general manager; M. B. Ericson, secretary-treasurer and general manager.

Halladay officers are: L. L. Halladay, chairman of the board; W. G. Pancoast, president; A. G. Grimm, vice president, continuing as manager of the Decatur plant; M. B. Ericson, secretary-treasurer.

To provide means for a substantially increased production, a 7 per cent stock issue of \$500,000 has been approved by the company, being underwritten by Gorrell & Co., Chicago bankers.

### DUNLOP CUSHION ON MARKET

BUFFALO, April 12.—The Dunlop Tire & Rubber Co. is marketing a solid cushion tire to be known as the Dunlop cushion, which at present will be built in two sizes, 36 x 6 and 36 x 5. The design of the Dunlop cushion is highly individualized. Through the center of the tire is a typical Dunlop mileage strip. On each side and placed at angles are blocks somewhat of the same pattern as those on the standard Dunlop solid non-skid. These blocks serve to grip the road. The sides of the cushion are so constructed that when the vehicle is loaded there will be no undue bulge of the tire.

The cushion or air channel of the tire, which runs through the center of the base just above the corrugated rim on which it is mounted, is claimed to eliminate the hot spot or region of fatigue found in some solids.

### NAMED TIRE DISTRIBUTOR

ROCK ISLAND, Ill., April 12.—Arthur Barlow, head of the Barlow Auto Supply Co., Church and Chestnut streets, Rockford, Ill., one of the largest supply houses in the city, has been named distributor for Goodyear tires in this city.

## Unique Campaign for Prospects Launched

ELGIN, Ill., April 12.—The Elgin Daily Courier, in conjunction with local motor car dealers, has launched a unique campaign calculated to produce prospects for new cars.

The newspaper will pay \$10 each week for an indefinite period to the contestant who submits the longest list of persons having expressed an intention to invest in a motor car in the near future. The name of the car favored is required with each name. In addition, each dealer of the city has agreed to pay \$10 to the person who sends in the name of a prospect, providing a car is sold within 30 days after the name is received. It is stipulated that the names submitted may be of new prospects and not included upon lists already in possession of dealers.

It is believed this contest will have the effect of producing many additional sales during the spring months.

### DETROIT HOUSES MERGE

DETROIT, April 12.—The Muzzy-Lyon Co. and the Federal Bearing & Bushing Corp., both of this city, have merged into a new corporation to be known as the Federal Mogul Corporation. The new name is derived from the trade names of the products of the two former companies.

Plants of both companies will be continued, giving a combined manufacturing space of more than 100,000 feet. No new financing is to be undertaken in connection with the merger as the capital of the new corporation is declared ample.

Officers and directors of the Federal Mogul Corporation are made up from the personnel of the former companies. J. H. Muzzy will be chairman of the board; Lloyd P. Jones, president; H. Gray Muzzy, vice president; David W. Rodger, secretary, and S. C. Reynolds, treasurer. The officers and H. W. Grant, F. C. Heath and C. R. Murphy comprise the board of directors.

### HE SUGGESTS ADVERTISING

WASHINGTON, April 12.—Sales of automobiles, tractors and accessories in Japan would be considerably increased by a well planned and intelligent advertising campaign, according to Assistant Trade Commission P. P. Steintorf, who has just cabled this information to the Department of Commerce. "However," he reminds, "in advocating advertising for American goods it is necessary to emphasize the necessity of the greatest care and forethought in selecting media and carrying out the campaign. Poorly planned, spasmodic advertising is worse than useless."

## Trying to Save Avery Company From Long Siege of Litigation

**Peoria Chamber of Commerce Takes Friendly Hand in Troubles of Manufacturing House**

PEORIA, Ill., April 14.—John W. McDowell and Clark Montgomery, former U. S. district attorney, have been appointed receivers for the Avery Manufacturing Co., which went into voluntary bankruptcy. Chicago banks are principal creditors and Peoria Chamber of Commerce officials are in conference in a final effort to reach some financial arrangement to save the company from the necessity of extensive court litigation. Under the receivers the plant will be temporarily closed but will be operated sufficiently to complete stock now on hand.

A statement of Nov. 30, 1923, showed assets of \$8,956,080.22 and liabilities of \$6,001,966.94. While condition of the company's affairs is said to be critical, as the result of the depression throughout the agricultural fields, sign of hope for resumption of the farm implement and tractor plant was held out in the assurance that the farm implement business has turned the corner and the market is growing stronger.

The Avery company was formed in 1882 with its first plant in Galesburg, but in 1890 the demand for better facilities caused its transfer to Peoria, where a settlement grew up around the factory and was named Averyville. A corn-stalk cutter was the first article of the Avery catalog but the plant extended its products to all farming machinery and implement and especially threshing machinery. In the war time it developed the caterpillar tractor and experienced a phenomenal growth as that tractor was utilized all over the world. The depression of 1920 struck the Avery plant hard and since then it has been facing a crisis in an attempt to solve its financial problems.

Knox College, of Galesburg, named a beneficiary in the will of the late Cyrus M. Avery, one of the founders, but since involved in litigation over its settlement, is one of the creditors and the Central Church, also a stock beneficiary, has escaped a similar fate through sale of its block only three years ago.

J. B. Bartholomew is now president; R. J. Boynton, vice-president; G. L. Avery, secretary, and F. P. Kinney, plant superintendent.

### NEW LICENSE PLATE RECORD

SPRINGFIELD, Ill., April 12.—Illinois completed the first quarter of the current year with a record of having issued automobile licenses totaling 780,000, nearly 250,000 more than during the first quarter of 1923. Louis L. Emmerson, secretary of state, attributed the record enrollment, in a large measure, to the "education" of the state motorists and their apparent desire to aid the department in the performance of its work.

## WITH THE ASSOCIATIONS

### Name Temporary Officers

PARKERSBURG, W. Va., April 12.—Temporary officers were selected to govern the West Virginia state automobile organization at a meeting held in the assembly room of the Chancellor Hotel, with delegates present from automobile clubs of the most important cities in the state. Charles E. Morgan, secretary of the Clarksburg Automobile Club, was elected president of the temporary organization. Paul C. Lehmann, president of the Parkersburg Automobile Club, was elected vice president, and C. F. Underhill, secretary-treasurer of the Charleston Automobile Club, was elected secretary-treasurer of the state association.

### Form New Association

NEW KENSINGTON, Pa., April 10.—On Wednesday, March 19, another new association was organized by the Pennsylvania Automotive Association in New Kensington, Pa. The by-laws as furnished by the P. A. A., which includes 100 per cent of the local association becoming members in the state organization, were adopted. This organization meeting was attended and addressed by R. C. Duffus and was followed by a talk by W. C. Cheeseman, Buick and Cadillac dealer and president of the dealers' association in Butler.

The officers of the New Kensington association are as follows: President, A. E. Greenwald; vice president, A. M. Fredericks; secretary, A. F. Shank.

Twenty-four dealers attended this meeting. They enjoyed a fine dinner and the subjects of national, state and dealers' associations, also state and national legislation and the Appleby used car plan were discussed.

### Hold Annual Meeting

PHILADELPHIA, April 14.—At the annual meeting of the Automotive Service Association, the following officers and directors were elected: President, Paul M. Woodring; first vice president, Capt. Dalton Risley, Jr.; second vice president, Albert Heer; secretary, W. H. Metcalf; treasurer, R. M. Brown; directors, George H. Matlack, James B. Dickson, Joseph T. Collins, Frank L. Cox, F. E. LaFehr and Edgar Mellor.

An admissions committee, made up of the following members, was chosen: Alfred E. Wood, R. M. Brown and Howard L. Brooks.

The association consists of service managers of Philadelphia automobile and motor truck distributors. The speaker of the evening was John M. Bushey, Philadelphia branch manager of the Firestone Tire & Rubber Co., who gave an illustrated talk on the construction, maintenance and use of balloon tires.

### Large Crowds See Show

QUINCY, Ill., April 14.—Crowds streamed through the Fifth Armory at

the Quincy Auto Dealers' Association annual show which, despite the lateness of the season, benefited by the first auto-suggesting days of the spring. Fourteen dealers co-operated in the display of 19 makes of cars and a score of accessory men participated in the display. It was one of the most successful shows in the association's history and dealers felt gratified at the manner in which public interest was displayed and the indication of early sales.

### Name Todd President

SPRINGFIELD, O., April 14.—Governors of the Springfield (O.) Automobile Club at a recent meeting elected these officers: President, Arthur J. Todd; vice president, C. S. Burke; treasurer, B. F. Faris; secretary and manager, Harry D. Brydon. Mr. Burke is president of The C. S. Burke Company, Studebaker distributors, and Mr. Brydon has been secretary and manager for several years. The automobile club is co-operating with the city and county officials in placing danger signs and in having roads and streets put in good condition. The club agreed to drag the entrances to the city if the city will pick and roll the streets unpaved.

### Atlanta's Show Big Success

ATLANTA, Ga., April 12.—The official report of the board of directors of the Atlanta Automobile Association regarding the recent Atlanta Show, shows that the exhibition this year was the most successful in the association's history both from a financial standpoint and from sales made by dealers during the show. In spite of inclement weather attendance was considerably larger than any previous shows, and total automotive sales exceeded \$200,000 as reported to the association by the dealers exhibiting, 20 per cent larger than any previous show.

### Rockford Dealers Elect

ROCKFORD, Ill., April 14.—At the annual meeting of the Rockford (Ill.) Automobile Dealers' Association new officers were elected for the coming year as follows: President, C. W. Williams; first vice president, A. C. Price; second vice president, W. B. Taylor; third vice president, Warren McCollum; secretary-treasurer, Murray Bird.

### Writer on Program

FORT WORTH, Tex., April 12.—One of the chief speakers at the annual convention of the Texas Automotive Dealers' Association here April 17 and 18 will be E. B. Gallaher of Norwalk, Conn., president of the Clover Manufacturing Co., one of the foremost financial and business writers of the day. More than 500 automotive men are expected. Elis Boyd, president of the Fort Worth association, is in charge of the program and the entertainment features.

## Planning Effort to Revive Road Racing at Los Angeles

### Promoter Declares Contests as Contemplated Should Provide Engineers Valuable Information

LOS ANGELES, April 12.—Road racing will be revived here if plans of the promoters, as announced, are fulfilled. The contest planned will be a radical innovation, inasmuch as the route to be covered will be over privately owned property. The state law prohibits speed contests of any kind on public highways. George Bentel, owner of the Ascot Park dirt track, is sponsoring the project.

The proposed course has been surveyed and announcement has been made that the first race will be Thanksgiving Day, for a prize of \$50,000. The course to be constructed will be 30 feet wide and about 4½ miles long. More than half the course will be in full view of the grandstand. The contemplated road is to have a number of extremely sharp, hairpin turns and one grade of nearly 30 per cent. Ralph DePalma, the racing driver, predicts the route will make possible the most interesting road contest in the world and that properly designed cars can average about 50 miles an hour for 50 laps.

Bentel claims he expects automobile factory engineers to become interested in the proposition. He declares that racing over such a course will provide experience of value to automobile builders. The claim is made that on the board track speedways of the country top speed is the only thing sought and, as a consequence, the building of cars capable of participating is restricted to only two or three concerns in this country.

### GOES IN FOR HIMSELF

NEW YORK, April 12.—Ray B. Prescott, for nearly three years statistician of the Class Journal Co., has resigned to go into business for himself, with offices at 200 Fifth avenue, New York City. He will still retain a connection with the Class Journal Co. on a consulting basis. Mr. Prescott has been identified with the automotive industry for about 15 years, covering nearly every phase. Since the war, in which he fought as captain in the Motor Transport Corps., he has devoted his entire time to the study of marketing and sales analysis problems of the industry, in which he now intends to specialize.

### STILL DUTY-FREE

NEW YORK, April 12.—A cable from Tokio announces that import levies on most of the commodities which have entered Japan duty-free or at reduced rates since the September earthquake, will be restored to the normal schedule at once. Among the exceptions made, however, are motor trucks and accessories, engines and parts, which will continue duty exempt.

## Condemns Proposal for U. S. Control of Gasoline Supply

**Member of Cincinnati Club's Investigating Body Contents Henry's Idea Would Be Impractical**

CINCINNATI, April 12.—The attitude of Thomas P. Henry, president of the American Automobile Association, in advocating government control of gasoline, was condemned by M. R. Singleton, member of the Cincinnati Automobile Club Committee investigating the gasoline situation, before directors of the club, at the Hotel Haylin.

Mr. Henry's view is not only socialistic but impractical, according to Mr. Singleton. Large corporations make for stable prices in the gasoline industry, he declared, and also promote the development of oil fields.

"Excess prices in gasoline have their source in high freightage rates rather than in any fault of the oil companies," said Mr. Singleton. "Contrary to popular belief, the oil industry is not in the control of a monopoly," he asserted.

A resolution was adopted by the directors to ask the city to pass an ordinance requiring stop lights on the rear of street cars. It also was decided to demand enforcement of laws forbidding the spreading of glass in the streets and enforcement of the boulevard stop plan for automobiles.

### HOLD ANNUAL MEETING

ST. LOUIS, April 12.—Phillip H. Brockman, president of the De Luxe Auto Co., Oldsmobile distributor in St. Louis, and Joseph A. Schlecht, president of the Mound City Auto Co., Gardner and Auburn distributors, were the principal speakers at the annual meeting of the St. Charles Automobile Dealers Association meeting, St. Charles, Mo., recently.

Mr. Brockman talked about traffic regulations, which he has had an excellent opportunity of studying because of his position as president of the St. Louis Board of Police Commissioners, while Mr. Schlecht spoke on the prospects for the automobile industry during 1924.

Cashiers of five banks in St. Charles and other prominent business men were guests at the meeting and several of them made addresses.

### LEASE UNION BUS STATION

DES MOINES, April 12.—Ten bus lines operating out of Des Moines have leased a new Union Bus Station at 106 Sixth avenue and are making it the bus headquarters of Des Moines. The new station will take care of passengers who are daily transported to and from Des Moines by bus. Facilities include a waiting room, cigar stand, a lunch stand and a check stand.

The following terminal points in Iowa are now served by buses running from Des Moines: Indianola, Adel, Winterset, Guthrie Center, Newton, Grinnell, Pella, Runnells and Madrid.

## Secretary-Manager of I. A. T. A.



*C. W. Coons is the new secretary-manager of the Illinois Automotive Trade Association, with headquarters in Peoria. He is laying plans to make this a live year for the organization*

## Out Around Frisco They Blame Part of Slump on Dry Weather

SAN FRANCISCO, April 12.—Four factors have combined to slow up automobile sales in this section, and to make dealers cautious in stocking up for spring and early summer business. First of these is the comparatively dry winter, with not enough rain to insure crops for the coming summer; second, and probably greatest, the hoof and mouth disease epidemic in central and northern California, with the resultant destruction of several thousand cattle and the embargo on automobile travel; third, the general unrest incidental to a presidential election year; and, fourth, the oil investigation at Washington, with the possibility that the California fields will be involved.

The lack of activity in buying is general in all makes of cars.

Motor truck dealers have felt the slowing down even more keenly than passenger car dealers, while used cars of all makes are selling to better advantage than in either January or February.

### REPORT DENIED

DETROIT, April 12.—A report to the effect that the American Railway Express Co., in conjunction with railroad interests, is planning the formation of a large nation-wide company to take charge of all of the less than carload freight handled by the different railroads in the different cities of the country, and which would mean that hundreds of existing trucking concerns which are doing this work would have to look elsewhere for business, has been denied by officials of the American Railway Express Co.

## Statistical Bureau Expected to Cut Losses on Used Cars

**Say Pittsburgh Plan Will Prevent Prospect From Playing One Dealer Against Another**

PITTSBURGH, April 12.—One of the first progressive movements for cutting down the losses on used cars has been taken by Pittsburgh dealers in the decision to establish a reference appraisal bureau to be conducted in connection with the Pittsburgh Automobile Dealers' Association.

Fluctuations in resale price shortly will be thing of the past under the new plan, it is contended, which will prevent the owner from "shopping" a used car from one dealer to another with the idea of getting the greatest amount of money in a deal. Under the bureau's plan an expert from the bureau makes an appraisal which is filed for reference available to all dealers.

Sixteen manufacturers' dealers in the Pittsburgh district are supporting the statistical appraisal bureau.

As described by a dealer, the new system will work in this manner:

"John Smith bought a car in 1923. He ran it 7,500 miles. He kept it on the road and aside from the ordinary wear on its machinery and a few scratches and slight dents on the body, it looks to be in good shape. He desires to sell and goes to a certain dealer who offers him \$400, less the cost of putting the car in shape to sell and less 15 per cent for selling. Smith thinks he can do better and goes to another dealer, but before the second dealer ventures an offer he calls the statistical bureau and gets the previous dealer's appraisal and offers the same amount and terms."

The system holds good in a resale or a trade for a new car. When the bureau functions it will provide not only protection for the dealers but will tend to standardize the price of used cars, the dealers say, and will hasten the consummation of deals which often are delayed by haggling over the trade value.

### EXTEND BUS SYSTEM

DAVENPORT, Ia., April 12.—C. C. Richardson, Iowa motorbus magnate, has announced establishment of new service lines, linking 12 other towns in the system. Marshalltown, Carol and Osceola are listed as terminal points. Radio equipment on the new lines will be a feature and a fleet of Fageol safety coaches are to be put in the run. The service to Osceola will advance that line 51 miles nearer the proposed Bethany, Mo., terminal, 122 miles south of Des Moines.

### SALESMANAGER RESIGNS

AKRON, O., April 12.—Announcement is made by the American Rubber and Tire Co. here that R. W. Brouse, for several years salesmanager of the company, has resigned but that his successor has not as yet been definitely decided upon.

## Old Law of Supply and Demand Having Effect, Declares Shaw

### N. A. A. Executive Finds Conditions Force Buying of Used Cars at Lowest Figure

ST. LOUIS, April 12.—The steady increase in the amount of trading that economic conditions are forcing on automobile dealers is also steadily forcing on the dealer the necessity for buying the used car at the very lowest possible figure, says Lynn M. Shaw, assistant general manager of the National Automobile Dealers' Association, in a report which he announced today showing the increase in trading. He asserts that the old and ruthless economic principle of "supply and demand" is having a powerful effect.

"In comparison to the number of new motor vehicles supplied every year," says Mr. Shaw, "the visible supply of used motor vehicles becomes ever greater. The demand for new motor vehicles increases with the years, while the demand for used motor vehicles very naturally must decrease in ratio."

The supply of used motor vehicles increases each year in greater proportion than the demand. This weakens the selling price level for used vehicles. The automobile dealer trading in the old car must keep his allowance price below the selling price level, if he is to sell the used vehicle without a loss. Few of them are doing it. The public expects too much money for its used vehicles, in comparison to the market value. Sales of new cars is more and more a repeat business.

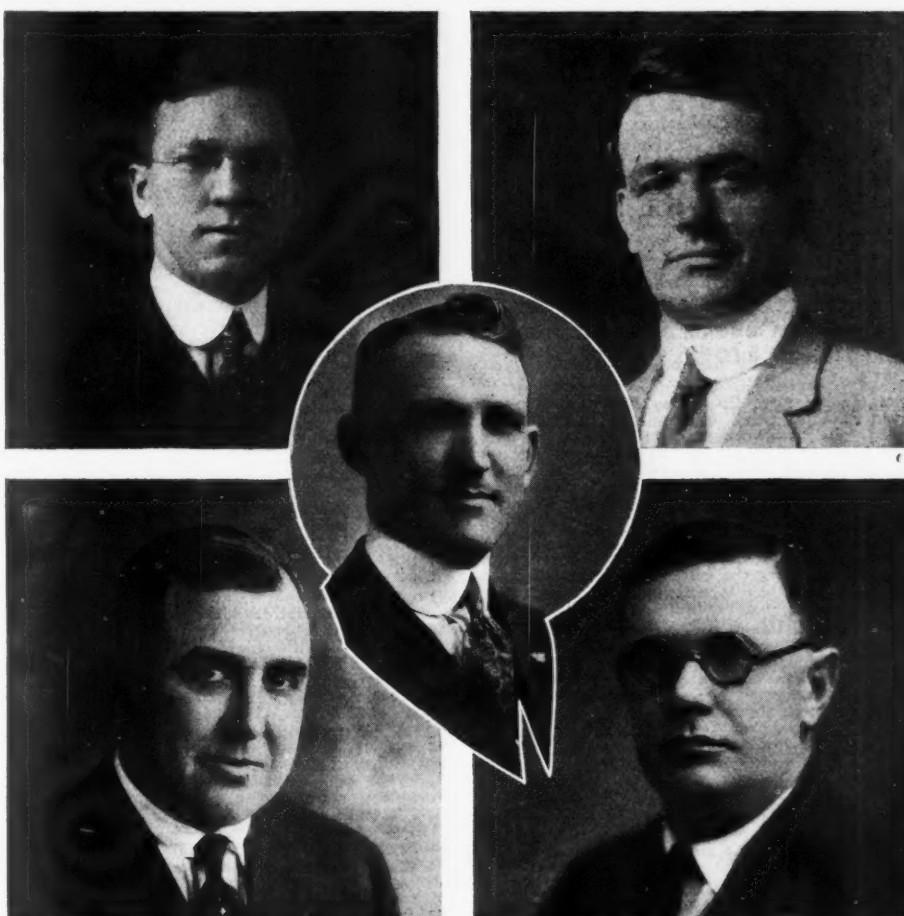
"In Minnesota 53.6 per cent of all new car sales in the first quarter of 1924 involved the trading in of an old car; in Arkansas-Tennessee, 65.9 per cent; in California, 66.3 per cent; Ohio, 60.7 per cent; Illinois, 74.1 per cent; New York, 63.2 per cent; Pennsylvania, 52.8 per cent; Michigan, 70.8 per cent; Indiana, 76.9 per cent; Iowa, 75 per cent; Missouri, 66.5 per cent; Wisconsin, 58.5 per cent; Oregon, 72.7 per cent; Washington, 53.1 per cent; Louisiana-Mississippi, 61.8 per cent, and everything points to a steady increase, to expect that by the end of 1924 more than 75 per cent of all new car sales will involve the handling of a used car. Such a large part of the business being affected, it must be handled without losses of the size recorded in 1922 and 1923."

### OUTLOOK IMPROVED

SACRAMENTO, Calif., April 12.—General rains throughout the Sacramento Valley and heavy snows in the mountains have greatly improved the outlook for automobile sales in the interior section of Northern California. Rainfall still is somewhat below normal, but agricultural interest is much more optimistic.

Low and medium priced cars are receiving the principal benefit of the increasing buying. Truck sales also are better.

## Guide Destiny of I. A. T. A.



*These are officers of the Illinois Automotive Trade Association who were named at the Galesburg convention. (Center) President C. R. Constant, Springfield. (Upper Left) First Vice President W. E. Butler, Chicago. (Upper Right) Second Vice President George Kellall, Joliet. (Lower Left) Third Vice President Fred A. Sperry, Bushnell. (Lower Right) Treasurer W. W. Ingram, Peoria*

## 25 Million for Diesel Type Engine Authorized by Measure

WASHINGTON, April 12.—Installation of the Diesel type engine in the Shipping Board ships at a cost of \$25,000,000 is authorized by a bill passed in the House and sent to the Senate. The money would be available from the board's \$66,000,000 construction loan fund. The measure, sponsored by Representative Edmonds (Republican), of Pennsylvania, also would authorize loans to private ship-builders for the installation of the Diesel engine up to an amount equal to 50 per cent of the work's cost. An additional loan up to two-thirds of the cost would be made if sufficient security were given.

### DELIVER PEERLESS SIXES

CLEVELAND, April 12.—The first deliveries of Peerless sixes are now being made to dealers and distributors. Although the new six was announced in January and models were shown at the New York and Chicago shows, up to this time no cars have been available to the trade. Deliveries will now be coming through on schedule.

### OPEN USED CAR EXCHANGE

ST. LOUIS, April 12.—Eugene Methudy, who has been in the tire business in St. Louis for a number of years, and Ralph W. Page, president of the Carondelet-Buick Co., have opened the Methundy & Page Used Car Exchange at Grand boulevard and West Pine.

Extensive alterations will be made in the building to provide ample storage and display facilities.

The premises will also be provided with a gasoline station.

### SUPPLYING YELLOWS

AKRON, O., April 14.—Seiberling Rubber Co. of Barberton confirms officially the report that the company is now making tires for the Yellow Taxi Cab Co. which contain the name of the Yellow Cab Co. instead of the name of the manufacturer.

### HEAVY DEMAND FOR TRUCKS

AKRON, O., April 12.—Announcement is made officially by local officials of the International Harvester Co. that a night force will be added to the Akron parts plant to meet constant increases in demand for trucks now being registered.

## BUSINESS NOTES

**Capitol Motor Sales** has been incorporated in Sacramento, Calif., and has opened temporary salesrooms at 9th and L streets for Chandler and Cleveland cars. This franchise has been vacant in Sacramento since the first of the year. Directors of the company are D. M. Lerer, C. W. Lerer and M. L. Wilcox, capitalization \$10,000.

**Paige-Jewett Motor Company**, Sacramento, Calif., has filed articles of incorporation with a capital stock of \$50,000. L. P. Klemmer, C. C. Ely, Lenus Klemmer, J. A. Brown and Albert M. Bemmerly are directors. This is a reorganization of the local firm of Klemmer Brothers, Paige-Jewett dealers, to provide additional capital.

Contracts are being awarded by the Wisconsin Metal Products Co. of Racine, Wis., for a new \$125,000 manufacturing plant at DeKoven and Phillips avenues, to be ready by summer. The main building will be 100 by 246 ft. and equipped with new machinery for the production of metal stampings, principally for the automotive industries.

The Modine Mfg. Co., since 1916 manufacturing automobile, truck and tractor radiators at Racine, Wis., and occupying 100,000 sq. ft. in leased quarters, has purchased the large factory building of the former Racine Hardware Mfg. Co. at Seventeenth and Racine streets, for \$100,000, and within 60 or 90 days will effect a great increase in its capacity.

Contracts have been awarded by Brooks & Cafey, owners of the Mangum Motor Company at Mangum, Okla., for the erection of a brick building to cost \$30,000. It will house a garage and filling station.

Trade Commissioner A. A. Osborne at Rome, Italy, this week advised the Automotive Division of the Department of Commerce at Washington that three Italian companies most prominent in the manufacture of batteries for the ignition and starting of automobiles have recently announced increases of prices as follows: Hensemberger, 5 per cent, Scaini, 10 per cent, Tudor, 15 per cent.

The Weber Tool, Die & Machine Co., Middlebury, Vt., has been chartered with a capital of \$100,000 to manufacture and sell accessories for automobiles, among other things. Incorporators are Arthur J. Weber, Ruscum S. Hicks, Richard C. Dowling, G. W. A. Wilmer and W. H. Johnson.

Taking effect April 1, 1924, the business trade name and good will of the Gurney Ball Bearing Company, Jamestown, N. Y., have been taken over by the Martin-Rockwell Corp., which corporation will continue the business under the name Martin-Rockwell Corp., successor to Gurney Ball Bearing Co. The general offices of the corporation are located at 402 Chandler street, Jamestown, N. Y.

The Larson-Clayton Motor Co., Sault Lake City, has assigned its assets to Lawrence H. Heath for the benefit of creditors. The liabilities are stated to be \$18,955.60 and the assets \$4,504.34.

The sale of the factory buildings of the Pan-American Motor Co., Decatur, Ill., has been decided upon by the receivers. The structures have been idle for two years and without any income in the way of rental. Judge Baldwin will arrange for the sale if a reasonable bid can be obtained.

New York Transportation Co., of which the Fifth Avenue Coach Co. is a subsidiary, reports that the bus line had a 1923 net income of \$1,285,924 after all charges and taxes, equal to \$5.71 a share on the \$2,350,000 of capital stock, comparing with \$1,141,059, or \$4.85 a share in 1922. The consolidated statement shows a surplus of \$315,924, against \$671,059 in 1922.

B. F. Goodrich Co. stockholders will be asked at the annual meeting to approve a reduction in the common stock from 1,500,000 to 750,000 shares. This, it is said, will not mean any change in the capital of the company so far as the stockholders are concerned, as all of the stock above 750,000 shares is held in the treasury.

Hupp Motor Car Co. reports gross sales of \$38,013,014 in 1923, against \$34,122,847 in 1922. Net profits were \$2,635,788, against \$3,763,963, which, after deductions for preferred, equals \$4.54 a share earned on the \$5,711,310 common stock of \$10 a share value outstanding, against \$7.13. Surplus amounts to \$2,039,846, against \$3,185,901.

Hudson Motor Car Co. stockholders have approved a stock dividend of 10 per cent, payable April 15 to stock of record April 10. They also have approved increasing the common stock from 1,200,000 shares no par to 2,000,000. Of the new stock 120,000 will be used for paying 10 per cent stock dividend and the remainder held for future use.

Paige-Detroit Motor Car Co. stockholders have approved the plan to issue \$3,000,000 in three-year 6 1/4 per cent notes, maturing serially \$500,

000 each six months, beginning Dec. 1, 1924. Volume of business in January, February and March was respectively \$4,427,000, \$5,461,000 and \$6,800,000.

Business of the Burgess Battery Co. of Madison, Wis., in 1923 reached the record-breaking volume of \$2,200,000, according to the report of officers to stockholders at the annual meeting on March 31. The report speaks of prospects for 1924 as being likely to produce double the 1923 volume of business.

The Hall Garage Company, Wausau, Wis., has increased its capital stock from \$25,000 to \$100,000 for the purpose of expanding and developing its business. The company handles the Packard, Velie, Maxwell and Chrysler and will conduct its business on wholesale and retail lines in a territory recently made quite extensive.

Fifty-thousand dollars damages are asked in a suit filed in Birmingham, Ala., by J. B. Turner, an automobile dealer, against the Studebaker Corporation, of America, the Industrial Finance Company and the Cruse-Crawford Manufacturing Co. The plaintiff charges that the defendants made untrue statements about his financial condition, thereby preventing him from disposing of about 50 Studebaker cars on which he would have made profits of from \$200 to \$500 on each car. Turner was Studebaker representative in Anniston and Columbiana, Ala., at the time of the alleged difficulty.

The Norman E. Stoneburg Motor Co., of 2021 Adams street, Toledo, has been incorporated with a capital of 500 shares, no par value designated to buy and sell and deal in motor cars and parts and to operate a general garage. Incorporators are Norman E. Stoneburg, Margaret W. Stoneburg, Walter A. Weis, Margaret A. Dougherty and Frances A. Dougherty.

Marathon Rubber Products, Inc., is the name of a new \$100,000 Wisconsin corporation organized at Wausau by N. H. Zender, J. H. Elliott and associates, who have purchased the entire assets of the defunct Marathon Rubber Products Co. of the same city. Materials for the automotive industries are to be made a greater feature than heretofore by the new organization.

The Wolf-Min Young Co., Cleveland, has been chartered with an authorized capital of \$20,000 to store, repair and deal in automobiles, trucks, parts and accessories. Incorporators are William M. Young, Herbert J. Wolff, Clarence V. Liggett, Oriel D. Eshelman and Catherine M. Malloy.

Judge J. S. Baldwin, Decatur, Ill., ordered the receivers of the Comet Automobile Company to accept a bid of \$125,000, tendered for buildings and ground of the defunct motor car company, by L. P. Halladay, manufacturer of motor car accessories, formerly of Streator. The receivers reported that the property had been conservatively appraised at \$225,000 and was fully worth that sum, but that despite extensive advertising and individual effort to dispose of the plant, the best bid other than from Halladay, was but \$100,000.

Properties of the Climber Motor Company of Little Rock, Ark., consisting of 20 acres of land in Pulaski county, was sold to Dr. R. L. Saxon and John W. Dickinson, capitalists, for \$90,000.

The Greenlease Motors of Kansas City, Mo., have been incorporated with a capital of \$100,000 by R. C. Greenlease, E. M. Lied and E. R. Morrison.

The Phillips Motor Sales Co., Plateville, Wis., has been incorporated with \$50,000 capital stock to do a general automotive sales and service business. The principals are L. L. Phillips, L. G. Phillips and I. S. Phillips.

A Wisconsin corporate charter has been issued to the Hauskins Carburetor Co. of Clintonville, Wis., organized with an authorized capital stock of \$100,000 by Robert Miller, Dr. J. W. Devine and Raymond Mandel. No information concerning the purposes and plans of the organization has been given out. Clintonville is the seat of the large F. W. D. motor truck works and of several tractor concerns.

Stockholders and creditors of the Wisconsin Farm Tractor Co., Sauk City, Wis., have been called into joint meeting on Thursday, May 1, to take action precipitated by court litigation instituted by Carl H. Lehman, a stockholder and a creditor as well, "which may result in a judicial sale of the assets, rights, powers, privileges or franchises of the corporation," the notice issued by Secretary O. R. Burki says.

Martin E. Lehman who has been with the Vesper-Buick Co., St. Louis Buick distributors for the past two years after five years experience in the tire business has announced the formation of the Becker-Lehman Sales Co., Inc., to sell Brunswick tires, and in addition a complete line of automotive equipment with accessories. The firm will open for business at 3441 Pine street in the near future.

The Lovering Accessory Company has been organized at De Kalb, Ill., by W. K. Lovering and J. G. Lovering.

## Transportation Other Than Rail Registers Big Growth

### Forty-Two Per Cent Increase in These Facilities Between 1912 and 1922, Says U. S.

WASHINGTON, April 12.—Privately-owned transportation and transmission enterprises, other than railroads, increased in 1912 from a value of \$9,572,855,000 to \$13,607,570,000 in 1922, or 42.1 per cent, the United States Department of Commerce announced here last week in its preliminary estimate of the value, December 31, 1922, of the principal forms of wealth in the United States.

No comparison is possible, it is announced, for the value of motor vehicles, which was estimated in 1922 at \$4,567,407,000, because no separate estimate was made in 1912. All classes of property increased in value from 1912 to 1922 except live stock, which decreased slightly.

The total of all principal forms of wealth in 1922, according to the statistics, amounted to \$320,803,862,000, as compared with \$186,299,664,000 in 1912, an increase of 72.2 per cent. Per capita values increased from \$1950 to \$2918, or 49.6 per cent.

In making these estimates, the department followed in general the methods employed in making the estimates for 1912, though it is believed that in some respects the work in 1922 has been more thorough. It should be borne in mind that the increases in money value are to a large extent due to the rise in prices which has taken place in recent years.

### BRITISH SLOGAN WINS

WASHINGTON, April 12.—Only a fair demand for American tires exists in northern Ireland, according to Consul Henry P. Starrett, Belfast, who has cabled the United States Department of Commerce here to this effect. Publicity given to the slogan "Buy British Tires" in Ireland, Consul Starrett states, has been successful, with the result that about 90 per cent of the tires sold there are of British manufacture.

### RULES ON LICENSE FEES

COLUMBUS, O., April 12.—Judge E. B. Kinhead, in the Court of Common Pleas, declared unconstitutional a portion of the Freeman-Collister law, passed by the last Ohio legislature which increased the amount of license fees on motor trucks having 28.8 horsepower and over. At the same time he held constitution that portion of the law which vested control of motor trucks used commercially in the Public Utilities Commission.

### SWANDER STEPS OUT

CLEVELAND, April 14.—Dan C. Swander has resigned as vice president of the Eaton Axle and Spring Co., Cleveland. He was general manager of the Perfection Spring and Eaton Bumper divisions.

## CONCERNING MEN YOU KNOW

**James Eddy**, auditor at the Chevrolet assembly plant in Norwood, who has become head of the traveling auditing department of the General Motors Corporation, was tendered a surprise banquet at the Grand Hotel by employees of the auditing department. Samuel Schott of the accounts payroll department has been appointed to fill the vacancy left by Mr. Eddy.

**Webster Colburn** who has for some time been a business counselor in St. Louis, has associated himself with the De Luxe Automobile Co., Oldsmobile distributors in St. Louis of which Philip H. Brockman is president. Mr. Colburn at one time was a director and vice-president of the St. Louis Automobile Dealers Association.

**Harry B. Morgan** has been appointed sales manager of The Cleveland Motor Sales Co., St. Louis Cleveland distributors, according to an announcement recently by R. B. M. Tidd, president. Mr. Morgan has been with distributors of General Motors products in St. Louis for the past seven years.

**J. H. Michelin**, vice-president and general manager of the Michelin Tire Company, Milltown, N. J., was the guest of honor at a dinner given by the Michelin Tire Company of New England territory, presided, and he had as other guests at the head table, D. Bardin, factory sales manager, J. B. Hardy, in charge of the research department and T. F. Bowen, Boston office manager.

At a meeting of the Board of Directors of the C. R. Wilson Body Company, held in Detroit, Mich. Feb. 26, George D. Wilson was unanimously elected general manager of the company.

**Announcement has been made by Warren J. Shay**, sales manager, automotive division of the Columbus McKinnon Chain Co., Columbus, Ohio, that the company has appointed C. B. Clark as Pacific Coast sales manager of the automotive division of the Columbus McKinnon Chain Co. His headquarters will be San Francisco.

With the announcement by J. E. Fields, general sales manager of the Maxwell-Chrysler companies, that John D. Mansfield, who has long been associated with the management of the Dort Motor Co., has affiliated himself with Maxwell-Chrysler, another one of the industry's most prominent executives is brought into the Walter P. Chrysler organization. Mr. Mansfield's efforts will be put forth as a factory executive rather than in the dealer field.

**Paul M. Mahler** of Vienna, Austria, has been appointed export manager for The Westcott Motor Car Co. He has assumed his duties at the Springfield, O. factory. Mr. Mahler came here from Wausau, Wis., where he was connected with the D. J. Murray Manufacturing Company. He has served as export manager of firms in England, South Africa and South America.

**John A. Rose**, manager of the export sales department of the Nash Motors Company, has resigned to engage in an undertaking he has had under consideration for some time, details of which are not ready for announcement. Mr. Rose leaves with the best wishes and regrets of President C. W. Nash.

**W. R. Vick**, formerly manager of jobbing sales for the Perfection Heater & Manufacturing Company of Cleveland, is now connected with the H. L. Rackcliff Company, automotive marketing counselor of Cleveland.

**K. T. Keller**, formerly manager of production of the Chevrolet Motor Co., announces President Alfred P. Sloan of General Motors, has been made general manager of General Motors of Canada, Ltd., with headquarters at Oshawa, Ont., Can. Mr. Keller will report to R. S. McLaughlin, president of the Canadian General Motors.

**George D. Wilson** has been elected general manager of the C. R. Wilson Body Co., of Detroit. Mr. Wilson joined his father in the body building business at an early age, learning the art from the ground up. During later years he has been actively interested in production, sales and management and steps into the new position well equipped for the work.

**E. LeRoy Pelletier**, manager of advertising and sales promotion of the Rickenbacker Motor Co., will represent the newspaper division at the international convention of the Associated Advertising Clubs of the World, to be held in London, England, next July. Mr. Pelletier will address the convention on "The Successful Use of Newspapers in Developing the Automobile Industry."

**A. E. Barlow** has been placed in charge of distribution of Boyce-ite by the Boyce & Veedor Co., Inc., and will make his headquarters at the executive offices in Long Island City. Colonel H. B. Ramey, at one time district sales manager of the American Ever-Ready works and more recently vice-president and general manager of the Yale Storage Battery Co., Indianapolis, has been appointed western manager at Chicago.

**C. R. Standley**, formerly president of the Standley Manufacturing Co., Boone, Iowa, has joined the H. L. Rackcliff Co., automotive marketing counselors of Cleveland, Ohio, and will direct the research activities.

**Harry R. Rupert**, purchasing agent of the Roamer Motor Car Co., Kalamazoo, has resigned to join the sales staff of the W. O. Harlow Co., distributors of the Stutz and Oakland motor cars.

**Leo A. Lutz** has been advanced from the position of sales representative in the Buffalo division to manager of the San Francisco division of the Dunlop Tire & Rubber Co., handling California, Washington, Oregon, Idaho, Utah, Nevada, New Mexico and part of Montana. Kenneth C. Bugbee, office manager of the Dunlop Sales Co., will go to the coast with Mr. Lutz where he will serve as office manager of the San Francisco division.

**C. A. Dunham** has been appointed general sales manager for the Ohio Buick Co., at Cleveland. He has been director of wholesale distribution. He formerly was connected with the distribution of automobile tires, in which line he made a national reputation.

**Harrison Goldsmith**, western sales manager of the Cleveland Automobile Co., who was in St. Louis to discuss conditions with the new Cleveland distributor, the Cleveland Motor Sales Co., looks forward to a big automobile business this spring. Mr. Goldsmith based his observations on his recent tour of the United States.

The Milwaukee motor truck sales department of the International Harvester Co., 72-82 Reed street, is starting work on a large addition to the service department, to cope with the growth of its business in this territory. R. B. Hufford, formerly I. H. C. representative at Detroit, is now manager of the Milwaukee branch.

The T. W. Meiklejohn Co., of Fond du Lac, Wisconsin distributor of the Fordson and of tractor equipment generally, has opened a branch office and salesroom at 433 Prospect avenue, in Milwaukee, directly opposite the Milwaukee assembly plant of the Ford Motor Co. R. C. Holdridge is manager, and Clarence Beldin, assistant manager of the new branch.

**G. B. Gunlogson** has been advanced from advertising manager to general sales manager of the Case motor car division of the J. I. Case T. M. Co., Racine, Wis., in line with its policy to intensify sales effort in the automobile line. R. S. Walker has been promoted from assistant advertising manager to the post formerly held by Mr. Gunlogson. F. A. Wirt has been named sales promotion manager.

**R. B. Roach**, who has been well known in the industry in Baltimore and Washington for many years, has been appointed branch manager of the Miller Tire and Rubber Co., Fallsway and Eager streets.

**William Dwight Loomis** has been appointed export manager of the Gray Motor Co., the position having been newly created to care for the rapidly growing export business of the company. Up to the present the export business has been handled in conjunction with domestic sales. Mr. Loomis was for 12 years connected with the Cadillac Motor Car Co., and handled both foreign and domestic business for that concern, both at the factory and at the export offices in New York City.

**P. S. Redford**, formerly sales manager for the Mueller Furnace Co., Milwaukee, is the new sales manager for the Herford White Co., Wisconsin distributors of the Auburn motor car. Mr. Redford has been in the Herford White organization some time as a wholesale representative and was elevated to his new position on April 1.

**D. A. Ward** has been made manager of the tire department of the Cruse-Crawford Manufacturing Co., of Birmingham, Ala.

Auburn dealers throughout the eastern section of the country are very optimistic as to business conditions, according to R. H. Faulkner, director of sales of the Auburn Automobile Co., who recently returned from an extensive trip in that section of the country.

**Arthur W. Meyer**, Peerless distributor, in Buffalo, has just returned to that city from Miami, Fla., where he has been spending the winter with Mrs. Meyer. He reports good fishing, golfing and motoring.

**F. B. Caswell**, in charge of sales for the Champion Spark Plug Co., of Toledo, has been elected vice-president of that organization, continuing as before to handle sales.

**Stewart McDonald**, president of the Moon Motor Co., has returned from a six week's business trip to Europe, during which he closed new connections in the occupied German territory which produced an order for 200 cars. Mr. McDonald declares business in European countries shows decided improvement, with American cars selling freely in Spain, Great Britain and the Scandinavian countries. Moon foreign business this year, he says, will be about 10 per cent of the production.

**E. G. Poxson** has been appointed sales manager of the Dort Motor Car Co., succeeding John D. Mansfield, who resigned to become a factory executive of the Maxwell Motors Co. Mr. Poxson has been an important factor in the Dort organization for the past six years in the position of assistant sales manager.

## Show Public Where Fabulous Trade-In Price Yields a Loss

### Cleveland Association Issues Statement Setting Forth Some Truths About Used Car Problem

**CLEVELAND**, April 12.—One of the chief factors that has been used to put the merchandising of used cars on a sound basis in this city is that of advising the public on both sides of the problem.

The leadership in this campaign has rested on the Cleveland Automobile Manufacturers' and Dealers' Association. Herbert Buckman, manager of that organization, has issued for publication a statement which gives a fair idea of how the campaign has been waged in this city.

"The family that tries to avoid acceptance of a legitimate depreciation on its automobile by trading it in on a new car at a fabulous allowance, merely postpones, but with increased loss, the day of reckoning.

"There are some truths about the used car problem, which must become apparent to the thousands of families who own cars.

#### Valued by Mileage

"Bear in mind when you buy an automobile you buy mileage. You do not purchase merely so much steel and rubber and other materials. You purchase driving miles. Now say that the car you purchase has a driving mileage of 50,000. Then when that is driven, the use is out of the car, and when you turn it in on the purchase of a new car that fact of depreciation must be recognized, and the depreciation accepted.

"Two kinds of offers will be made you by dealers now selling cars. One offer will consist of an allowance on your car that is just what it is worth—taking into consideration its list price new, and deducting an appropriate amount for the use and mileage. The other kind of concern will make you a disproportionate allowance on the price of the new, virtually saying to you that, although you have had the full use of your old car, you don't have to shoulder any part of the payment for that use—that they, or someone else, will do that for you. Does that sound sensible?

#### Few Years Hence—What?

"The answer of course is what the different cars will be worth two, three or four years later. The story generally written is that cars sold by dealers making fair allowances do not depreciate so heavily as those new cars that permit undue allowances. Acceptances of a fair and justifiable mileage and use depreciation on your car may be delayed a little, but it can not be avoided and it is much better accepted as due than to be forced to take a greater loss later."

#### MAKE 110 CHRYSLERS DAILY

**DETROIT**, April 12.—Chrysler Motor Corp. reports an increase in production to a present high point of 110 cars daily.

## IN THE RETAIL FIELD

Durant and Star car dealers in the territory of M. B. Leahy, distributor, of Rochester, N. Y., met for a get-together dinner at the Hotel Sagamore at noon on April 1. The dealers listened to addresses by M. B. Leahy and executives of the Durant Motor Co., of New Jersey, and Durant Motors, Inc.

Star dealers of the Sacramento Valley were the guests of the W. I. Elliott Star Co., factory branch, Sacramento, at a banquet. Eighteen dealers and sub-dealers were present as well as the Elliott retail sales force. Addresses were made by Norman De Vaux, president of the Star Motor Co. of California; Forrest Arnold, sales manager of the Star Motor Co. of California; Robert Mulch, general manager, Durant Motors, Ltd., of Canada; Rodney Bridge, Stockton dealer, and C. H. Collier, Oakland dealer. W. I. Elliott and Spencer Elliott of the Elliott Co. also made talks.

In commemoration of their first year of successful business, during which they sold 744 automobiles, employes of the Willard Chevrolet Co., 4129 Frankford avenue, Philadelphia, celebrated their first birthday with a dinner and entertainment at Assembly Hall, Frankford.

Willys-Overland dealers from all parts of north and central Texas were in Dallas to learn from John N. Willys, president of the Willys-Overland Corp. of Toledo, what the company expected to do in the way of production this year. Mr. Willys said his company would manufacture and deliver 300,000 automobiles in 1924. Some 400 men attended the banquet given the Willys-Overland president here.

Coincident with the first showing of the Chrysler in Sacramento, Cal., it was announced that the Urquhart Hodgkins Co. has succeeded the Flint Motor Co. The new company is headed by Robert F. Urquhart and Francis Hodgkins and has the distribution of Maxwell-Chalmers-Chrysler for 14 northern California counties. Mr. Urquhart formerly was president of the Flint Motor Co., which was opened about two years ago as the Sacramento branch of the Campe-Rose Co. of San Francisco. He has been connected with the Sacramento row for 10 years in various capacities.

The Hall Motor Co., 1011-1015 Third avenue, Rockford, Ill., has been incorporated with \$25,000 capital to handle the Ford cars and tractors in this community. It will carry a complete repair and accessory line as well. Geo. D. Hall is president, William A. Hall, secretary, and Grace E. Hall, a member of the board, and incorporators of the company.

Enthusiasm, determination and a sincere love of work were the ingredients in the prescription for success as outlined by J. H. Newmark, manager of sales promotion for the Durant Motors, Inc., at a dinner in Buffalo, given by Joe Rath, Buffalo distributor of Durant and Star cars, for the members of his sales organization. The other speakers included F. A. Bonham, Carl H. Page, manager of sales and service for the Durant Motors of New Jersey, and W. H. Linberg, manager of parts and service for the Durant Motors of New Jersey.

One hundred Hupmobile dealers of the Illinois territory assembled in Peoria on April 2, the guests of Emil Metzger, president of the Reliance Motor Car Co. Fred B. Sides of Detroit, assistant sales manager for the Hupmobile company, outlined the methods for successful salesmanship. In connection with the rally, a banquet was served with Gus Kaemmerling of Peoria as toastmaster.

Steve Treat and J. B. Addington have purchased the Chevrolet agency at Marshall, Ark., from A. A. Hudspeth.

C. E. Dawson, general sales manager of the Chevrolet Motor Co. in Buffalo, announces the additions to his staff of C. W. Santee as manager of the educational division, and A. R. Kroh as manager of the retail development division. Messrs. Santee and Kroh have been connected with the Goodyear Tire & Rubber Co. for the past five years in sales promotion work.

Roy Quackenbush, formerly wholesale manager for the Chandler Motor Car Co. in the Rockford, Ill., district, has resigned to become sales manager for the Bergstrom Motor Co. of Rockford. The Bergstrom agency handles the Chandler and Cleveland cars.

### ACQUIRE TOP COMPANY

RACINE, Wis., April 12.—The Racine Surplus Materials Co. has acquired the entire assets of the Wisconsin Top Co., Inc., Racine, which was the consolidation of the McAvoy Bros. & Co. and the Wisconsin Auto Top Co. several years

Fred C. Day, Moline, Ill., has been appointed distributor of the Gray automobile in the Rock Island county territory and has opened a garage and sales agency at 1417-1419 Sixteenth avenue.

Lester Sweeting, 209 East Washington street, Bloomington, Ill., has been appointed distributor for the Chandler car in the McLean county territory.

A get-together dinner was given at Hotel Robert Treat, Newark, N. J., by the Durant Motor Co. of New Jersey to Durant and Star distributors and dealers from over New England. They were addressed by H. L. Brown, general manager; C. H. Page, general sales-service manager; J. H. Newmark, sales promotion manager of Durant Motors, Inc.; Frank Bonham, general manager of parts and service; John J. Bergen, of the Durant Corp. and others.

The Houston branch of the Mack Motor Truck Co. has been opened for business. J. George Truelson is in charge of the branch. The branch will serve south, southwest and southeast Texas.

The Wheeler Motor Car Co. has been organized at Maywood, Ill., with capital stock of \$10,000. It is proposed to distribute motor cars and motor trucks. A sales agency has been opened at 900 South Fifth street. The promoters include Albert Carlton and B. G. Wheeler.

Welch Brothers, of Fifth street and Lawrence avenue, Springfield, Ill., have been appointed distributors for the Overland, Willys-Knight and Packard cars in the Sangamon county territory. Howard Welch, senior member of the firm, ranks with the oldest distributors of that city.

Alex A. Russell, 5 to 7 Court street, Janesville, Wis., Paige and Jewett dealer, has started work on a fireproof garage and service building, 75x136 feet, with 25,000 square feet and storage space for 250 cars.

Myron Gilmore, formerly of Marsh & Gilmore, Monmouth, Ill., has formed the Gilmore Hart-Parr Co. to handle the Hart-Parr tractors in Warren, Knox and Henderson counties. He will have offices in Monmouth and Galesburg.

Lord & Wentz, 116 East Washington street, Springfield, Ill., have taken the Stutz agency for this community.

Edward H. Bube, who has been connected with the automobile industry in St. Louis for about 12 years, has taken over the Paige-Jewett showroom at 1 North Grand boulevard, one of the several branches established by the Newell Motor Car Co., Paige-Jewett distributors in St. Louis, to be operated on a sub-dealer basis. The name of the branch will now be the Bube Paige-Jewett Co.

Harry Fried, dealer in automobile specialties, has moved from 1701 Maryland avenue, Baltimore, to 1726 North Charles street.

Lord & Wentz, Springfield, Ill., have been appointed distributors for the Stutz car in the Sangamon county territory. The sales agency of the company is at 116 East Washington street.

The Case T. M. Co., Racine, has created a new department to be known as the Case motor car division. This will be in charge of G. B. Gunlogson, who has been with the company for 15 years.

W. R. Sober, who has been in the automobile business for the last twenty years and for the last seven years with the General Motors Co. in Kansas City, Mo., has acquired an interest in the Excelsior Springs Investment and Motor Co., and has moved to that city. He brought with him the agency for the Oakland cars.

The Winton Co. of Baltimore, Inc., has been appointed distributor in Baltimore city, Baltimore county, Carroll, Harford, Howard, Anne Arundel, Cecil, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Somerset and Worcester counties for the Haynes.

M. D. Bryant Co., Kalamazoo Ford dealers, is succeeded by the Ray T. Parfet Co. Mr. Parfet, graduate of the University of Michigan, has been associated with the A. B. Parfet Co., Port Huron, also Ford dealers. He is now in Kalamazoo and will make that city his home in the future.

The W. E. W. Corp. of Philadelphia was host Monday evening, March 31, to the Durant and Star dealers in the territory in which they have charge of distribution. More than 150 Durant and Star car merchandisers were present.

ago. The entire stock of Badger de luxe tops and automotive fabric products is being offered for sale at low prices for quick disposition. A large number of California tops for a wide variety of bodies is included in the lot now being sold.

**Predicts Motor Car Output of 1924 Will Approach 5,000,000**

**Big Production Seen by Firestone, Who Incidentally Still Stalks Rubber Growing Centers**

WASHINGTON, April 12.—Prediction that the 1924 production of automobiles will come very close to the 5,000,000-car mark was made by Harvey S. Firestone, automobile tire manufacturer, here this week while en route from his winter home in Miami Beach, Fla., to his home in Akron, O.

"The automobile today is a necessity, not a luxury," Mr. Firestone remarked. "Passenger cars, trucks, buses—all have come to stay. Indications point to a very busy year in the automotive industry. Of course we never can tell what will happen; but if nothing exceptional enters into the plans to give them a setback the year 1924 should be a year for a 'bumper' automobile crop."

Mr. Firestone stated that he will maintain his headquarters here indefinitely in the interest of uncovering rubber growing possibilities in regions outside of those affected by the English restriction act which went into effect late in 1922.

"America," declared Mr. Firestone, "should produce its own rubber, and to that end I have had my own investigating parties make surveys in various countries in addition to the expeditions sent out by the government."

It will be remembered that it was Mr. Firestone whose activities resulted in action being taken by Congress last year appropriating \$500,000 for sending expeditions to investigate new sources of rubber supply. These are now making their reports, which will be made public perhaps in the next two or three months.

### Expect Traffic Aid Through Garage System in Detroit

DETROIT, April 12.—A series of down-town and centrally located garages is being planned for Detroit for the purpose of taking parked cars off the streets and relieving traffic congestion. The garages will be built mainly for day parking but will be equipped to make minor repairs, and to do washing and other light service work, and carry lines of accessories.

The company to own and operate the garages will be known as Detroit Garages, Inc. It is now in formation. Among those interested are Roy D. Chapin, chairman of the board of Hudson Motor Car Co.; Howard E. Coffing, vice-president of Hudson; John B. Ford, Jr., Sun Oil Co.

Nicol, Ford & Co., investment bankers, have formed and underwritten the \$1,000,000 corporation which upon completion of organization, will proceed with plans for operation. The new garages will be the first of their type in Detroit.

# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Calumet, Mich.	April	Central Storage Co., Jos. A. Savini, Manager.
Chicago	Jan. 24-31, 1925	National Automobile Chamber of Commerce.
Detroit	May 19-23	Automotive Maintenance Equipment Show under auspices of N. A. C. C. and allied organizations, S. A. Miles, Manager.
Goldberg, N. C.	April 21-26	Chamber of Commerce, W. C. Denmark, Manager.
Green Bay, Wis.	Aug. 25-30	Automotive Division, Association of Commerce, W. F. Kerwin, Manager.
Kansas City, Mo.	Feb. 7-14, 1925	Kansas City Motor Car Dealers' Association Show.
Milwaukee, Wis.	Aug. 25-30	Milwaukee Automotive Dealers' Association, Fall Show, Bart L. Riddle, Manager.
New York	Jan. 3-10, 1925	National Automobile Chamber of Commerce.
Reno, Nev.	June 14-21	Annual State Exposition under auspices of Reno Motor Car Dealers' Assn.
Sacramento, Cal.	Sept. 1-10	State Agricultural Society, C. E. Paine, Manager.

Toronto, Ont.	Aug. 23-Sept. 6	Canadian Automotive Equipment Association and the Automotive Industries of Canada, Gib Robertson, Secretary.
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## FOREIGN SHOWS

London, Eng.	Oct. 16-25	
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## CONVENTIONS

Albuquerque, N. M.	May 26-31	U. S. Good Roads Exhibition.
Detroit	May 19-22	National Automobile Service Convention, under auspices of N. A. C. C.
Detroit	May 21-24	International Motor Transport Congress of N. A. C. C.

## RACES

Altoona, Pa.	June 14	A. A. A. 250-Mile Speedway Event.
Fresno, Cal.	April 24	A. A. A. 150-Mile Speedway Event.
Frisco, Cal.	Oct. 4	A. A. A. 150-Mile Speedway Event.
Indianapolis	May 30	A. A. A. 500-Mile Speedway Event.
Kansas City	July 4	A. A. A. 250-Mile Speedway Event.
Kansas City	Oct. 19	A. A. A. 250-Mile Speedway Event.
Los Angeles, Cal.	May 16-17	Annual Los Angeles-Yosemite Valley Economy Run
Los Angeles	Nov. 24	A. A. A. 250-Mile Speedway Event.
Syracuse, N. Y.	Sept. 1	A. A. A. 100-Mile Speedway Event.

## Truck Makers and Operators Are Getting Close Together

DETROIT, April 12.—The holding of a joint meeting by Motor Truck Industries, Inc., the organization of specialized truck manufacturers, and the Detroit Transportation Association, composed of cartage and fleet owners of the city, marks the opening of a relationship with truck operators which the truck manufacturing association plans to extend generally throughout the country.

Speaking at the meeting M. L. Pulcher, president of Federal Motor Truck Co., and president of Motor Truck Industries, indicated that much that was detrimental to the interests of either the manufacturer or owner, was a common problem, and as such should be combated jointly. Unfavorable legislation on road administration or on taxes, which handicapped the user, reflected back on the business of the manufacturer and called for united opposition, he said.

The dinner and meeting to the truck owners association, was preceded by a meeting of the manufacturers association at which plans were outlined for general activities. W. N. Hallanger, new secretary and general manager of the association, detailed plans for co-operating with owners' association. Percy Chamberlain spoke on the Appleby used car motomart and indicated advantages to car dealers in the 30 cities in which they are in operation.

## LOUISVILLE SALES GOOD

LOUISVILLE, Ky., April 12.—Prospects for spring sales among the Louisville dealers may be set down at this date as unusually good. The Sixteenth Annual Show, which closed the latter part of February, stimulated business for the leading dealers, whose salesmen are setting a dizzy pace for the whole trade locally.

Dealers handling the more popular lines report that they have assurances from their factories of prompt deliveries in whatever quantities desired, and it is as certain as can be in advance that the movement of automobiles from the centers of production toward Louisville will be greater than last year.

The trend is more and more in the direction of bigger business for the active dealers handling active, standard lines and less business for the hangers-on, who are gradually approaching the vanishing point. Indications are that 1924 will be a deciding year along this line.

## BLUE SKY CONVICTIONS

CHICAGO, April 11.—Morris Markin, former president of the Checker Cab Manufacturing Corporation, and Michael Glassberg, former treasurer, were found guilty of violating the blue sky law by a Cook county jury. Punishment was fixed at thirty days imprisonment in the county jail and a fine of \$2,000 in each case. The defendants have appealed.

## St. Louis' Safety Council's New Traffic Law Is in Operation

ST. LOUIS, Mo., April 12.—A new traffic ordinance, sponsored by the Safety Council of St. Louis, permits a maximum speed of 25 miles an hour for motor vehicles in the outlying districts of the city and 15 miles an hour in the congested districts.

Trucks of two tons capacity or less are prohibited by the ordinance from driving faster than 20 miles an hour anywhere in the city and heavier trucks are limited to 15 miles an hour and "metal-tired motor vehicles" to 6 miles an hour.

Persons who park their cars on the wrong side of the street are subject to a fee of \$10 to reclaim the machines from the police garage.

A traffic council has been created with power to make traffic rules for periods of not more than 90 days.

Persons who violate the speed law will be subject to a careless driving charge and evidence that a driver has exceeded 25 miles an hour for the distance of a city block will be construed as careless driving. The penalty will be a maximum of 6 months in jail, instead of fines.

## OPEN SERVICE STATION

CHICAGO, April 11.—The Kelly Motor Company, 3948 Robey street, this city, Hudson and Essex dealers, have opened a service and parts department at 4236 Lincoln avenue. The service station has 30,000 square feet of floor space.

# The READERS' CLEARINGHOUSE

## Questions & Answers on Dealers' Problems

### Tools That Lost Their Temper

Q. I would like to have instructions for retempering wrenches, chisels and dies that have been annealed by a garage fire. All the tools are soft and the large Stillson wrenches are soft the whole length. Frank Smith, Box 303, Osdick, Calif.

The proper tempering of tools requires both experience and equipment for best results. Accordingly the best way of handling this would be to send the tools to some concern equipped to do this work. We therefore send you by separate letter the names of some gear and spring makers in California and we suggest that you write to them and see if they would handle the work for you.

This applies especially to the taps and dies which might be distorted if improperly heated and in which there would be danger of getting them either too hard or too soft. Another suggestion is that you try to locate some local blacksmith, if there is one left in your vicinity and have him do the work for you. If it is not convenient to follow either of the above suggestions you might do the work yourself starting first on the wrenches. Mix up a solution using four ounces of salt, one-half ounce of saltpeter, one ounce of pulverized alum and one gallon of soft water.

If the water in your vicinity is obtained from wells, it would be well to use distilled water. Heat the wrenches to a cherry red and plunge in the solution. If a tool such as a wrench or chisel is heated to a cherry red and then plunged in water it will be hard and brittle and will break the first time any strain is put on it.

This method of treating is used however, in many cases but has to be followed by a tempering process. This means that the piece must be heated again to a certain point and then plunged. The temperature to which the parts should be reheated is roughly determined by color, which varies from a straw yellow to a blue, the corresponding temperature being from 450 degrees Fahrenheit to 549.

We would suggest your trying one wrench at a time and after it is finished use it and see if the temper is right. With the dies it would be highly desirable to have some concern equipped to do the work handle the job for you. However, the heating of dies is sometimes accomplished by heating a large block of steel in the fire and then setting the dies on the heated block of steel so as to allow the heat to be transferred to the die.

The die could then be quenched in the solution above given. In the hardening

#### *The Readers' Clearing House*

**THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.**

**All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks later, depending upon the space available.**

**Readers' names will not be published with articles, if a request to this effect is received with the letter.**

**Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.**

**Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.**

**Addresses of business firms will not be published in this department but will be supplied by letter.**

**Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.**

and tempering of steel there are a great many factors which affect the results such as the carbon content, the original temperature used when hardening and the temperature used when tempering. Oil is also used for cooling a piece which has been heated as it does not cool the piece so rapidly and accordingly has not the same tendency to make the piece brittle.

#### Engineering for the Service

Man

appears on page 24  
of this issue—read it

### Checking Valves By Piston Position

Q. I received a reply to question I asked in regard to timing the valves of the model D-45 1917 Buick. This car has recently been overhauled and fiber timing gears installed. If possible would like to know some method of checking the timing without taking the engine apart. There are four numbers on the fly wheel which are 3/4, 2/5, 1/6 and 7 degrees. Isn't there some method used by the factory or service station for timing the valves by these marks on the fly wheel? If you can give such information it would be very helpful. J. W. Morris, Mayetta, Kansas.

We believe that we can give you a method which is a little easier than referring to the flywheel. Turn the engine over until the piston in the front cylinder is coming up on compression. You can determine this by taking out a spark plug and holding your thumb over the opening until air starts to blow out. Then turn the engine a little farther until the piston is at its top position. Then feel the rocker arm which operates the exhaust valve of the number six cylinder which is the one farthest from the radiator. It should be tight, due to the fact that the valve is being held open.

Then move the engine some more, a little bit at a time, until the number one piston has gone down about 1/64 inch. At this point the number 6 exhaust valve rocker arm should just be loose so that it can be worked up and down a small amount. This shows that the exhaust valve of the number 6 cylinder has just closed. In the same way you can check the other cylinders although if one valve is properly timed the others will also be about right, except for slight variations due to tappet adjustments.

#### WHY ARGUE WITH A MAGNETO?

Q. In what way could I induce a Ford magneto to charge a battery? I have tried out several ways with coils but am afraid that I will ruin a battery so would like to know your idea. Oscar Holland, Trail Lake, Mississippi.

The Ford magneto develops alternating current whereas a storage battery requires direct current for charging. For this reason the Ford magneto cannot be used for charging a battery. If you have direct current in your town you can use a lamp bank as a resistance. If you have alternating current you will need a motor generator set or else a rectifier. If you have some source of power in your shop you can use a Ford generator for charging one battery at a time. If you wish additional information you might advise us what source of power you have, if any.

## Seeing Is Believing Selling Gas in South America

Q.—We are in receipt of an inquiry from one of our South American distributors in Lima, Peru, who is planning to open there a filling station for the sale of fuel and oil. This distributor also contemplates providing crankcase service and will perform greasing operations. We enclose a rough sketch which shows the dimensions of the plot available to him for this purpose. This plot is located on the main street of the city and is at present the site of a small park.

This distributor proposes to erect a modern concrete building with driveways on each side to permit cars entering from the street, and, of course, to provide a means of exit. The building should provide not only for filling with fuel and oil, but also for furnishing air and water. A pit or an elevated platform would be used for crankcase service, as well as for greasing operations.

We do not know whether you specify equipment for a building of this nature, but should you do so, we would suggest that the pump specified for filling cars with fuel and oil be of the visible type, that is, that the quantities of fuel and oil transferred to the car be readily visible to the purchaser, as the South American Latin is rather particular about this.

Possibly you may have on hand a number of plans that will meet the conditions we cite or perhaps it will be necessary for you to make up a plan to fit the particular situation. In either case, we shall be greatly obliged to you if you will send to us, care of Mr. Robertson of our Technical Division, your ideas on this subject; should you make a charge for this service, we will be very glad to pay it.—General Motors Export Co., New York.

Our plan is designed to cover the whole lot as you have not limited us as to space. We have a feeling, however, that perhaps we have gone too far, though we are sure our layout will appeal to the South American mind and its love of grandeur, even if being large enough to service all the cars in Peru.

We believe that this arrangement of the pumps is better than if they were placed between passages extending crosswise, because here a car may be driven

### Architectural Service

**I**N giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things,

we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

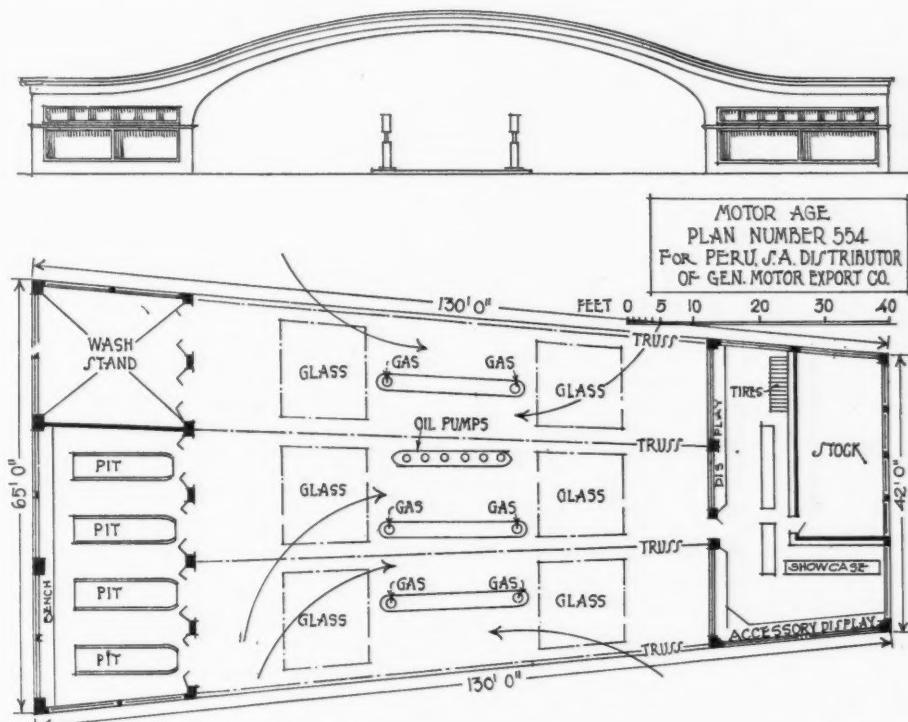
What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.



in, serviced and driven out to the street from which it came instead of being obliged to drive around the block to get back.

The greasing pits are enclosed as is also the wash rack at one end of the lot while an accessory and tire store is at the other end. The elaborate arched shelter between the two may, of course,

be omitted, leaving the pumps unsheltered or a flat roof may be used to cut down the cost, placing posts in the center where they will not interfere with car movements.

If the arched or other shelter is used it is well to introduce some glass because otherwise the pumps would be rather dark.

### SOME TRUCK SPECIFICATIONS

Q. Please send us specifications on the following trucks. Seagrave trucks, all models, American La France, all models. Auto Supply & Engine Company, Fort Madison, Iowa.

#### Model 2-R

Tons capacity, 2½. Wheel base inches, 160½. Rear axle tread, 66½ inches. Tire type and size front, 36x4. Tire type and size rear, 36x7. Engine make, Own. Engine number of cylinders, bore and stroke, four cylinders, 4½ by 6. Carburetor make, Stromberg. Ignition make, Splitdorf magneto. Generator and starter make, Westinghouse. Governor type, centrifugal. Clutch make, Own. Type, multiple disc. Gearset make, Own. Rear axle make and model, Own. Double reduction. Rear axle type, floating. Brakes service and location and type, external on drive shaft. Emergency brake location, rear wheels. Steering gear make, Ross. Steering gear type, screw and nut. Wheel type, spoked wood.

#### Model 3-R

Tons capacity, 3½. Wheel base inches, 164½. Rear axle tread, 66½ inches. Type and size of front tires, 36x5. Type and size of rear tires, 36x5. Engine make, Own. Engine number of cylinders, bore and stroke, four cylinders, 4½ by 6. Carburetor make, Stromberg. Ignition make, Splitdorf magneto. Generator and starter make, Westinghouse. Governor type, centrifugal. Clutch make, Own. Clutch type, multiple disc. Gearset make, Own. Rear axle make and model, Own. Rear axle final drive, worm. Rear axle type, floating. Brakes service and location and type, external on drive shaft. Emergency brake location, rear wheels. Steering gear make, Ross. Steering gear type, screw and nut. Wheel type, spoked wood.

#### Model 5-R

Tons capacity, 5. Wheel base, not known. Rear axle tread, 67 inches. Type and size of front tires, 36x6.

Type and size of rear tires, 40x6. Engine make, Own. Engine number of cylinders, bore and stroke, four cylinders, 4¾x6. Carburetor make, Stromberg. Ignition make, Splitdorf magneto. Generator and starter make, Westinghouse. Governor type, centrifugal. Transmission make, Own. Clutch type, multiple disc. Rear axle make and model, Own. Final drive, worm. Rear axle type, floating. Brakes service and location and type, external on drive shaft. Emergency brake location, rear wheels. Front axle make, Own. Steering gear make, Ross. Steering gear type, screw and nut. Wheel type, spoked wood.

Regarding the Seagrave trucks they are not listed in Class Journal specifications and as a matter of fact are not manufactured. Seagrave Manufacturing & Engineering Co. manufacture fire trucks exclusively and are not engaged in the manufacture of commercial vehicles.

## Charging 6-Volt Batteries From 32-Volt Lighting Plant

**Q**—Supply information and sketch for charging 6 volt battery from a 32 volt farm lighting plant.

1—We are showing three illustrations one of which shows a method of using two rheostat panels the one at the left indicated as having five batteries on charge while the one at the right has only one battery on charge. This method could be used in a garage or battery station and is most efficient if five batteries are charged at once.

Where only an occasional battery is on charge the methods may be simplified by using standard resistance units set in lamp sockets as shown in one of the other illustrations. The third illustration is a table which gives approximately the charging rate when various numbers of cells are on charge and various numbers of resistance units are in place. Source of supply on the rheostats and the resistance units will be given by separate letter.

2—Is it possible to charge a 6 volt radio battery with an automobile type generator?

2—Yes, the "A" batteries can be charged with an automobile type generator.

3—What make of automobile generator will work best driven from a 1½ h.p. engine? We have in mind and Auto-lite generator from a model 88 Overland car.

3—This will be all right. Before making permanent installation would suggest driving it at different speeds to see at what speed it will give about 10 amperes. This is a machine having a bucking series winding and as there is no third brush adjustment the output cannot be regulated. This is the reason for making a preliminary test to find the suitable speed.

### Effect of Exhaust Cutout on Main Bearing

4—Is an exhaust cutout hard on the crankshaft bearings, and if so, in what way?

4—This question is too deep for us. As far as we can see there is no definite relation between the use of a cutout and

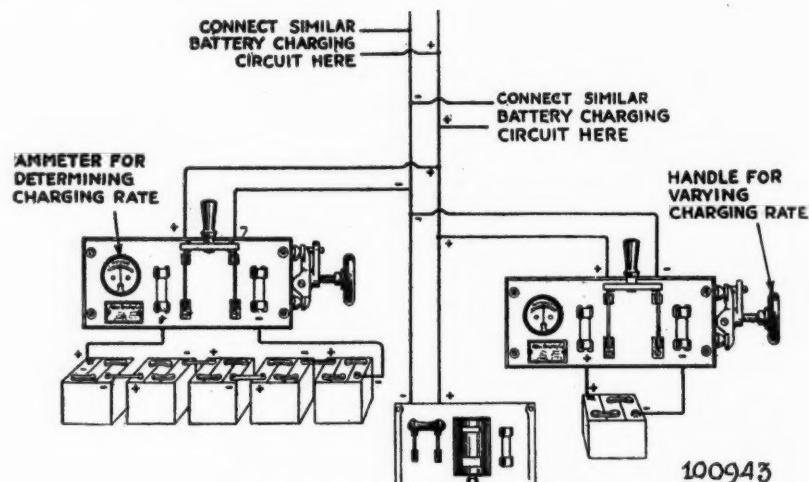
### PARTS DATA ON DIXIE FLYER

**Q**—Will you kindly advise us what make rear axle the 1917 Dixie Flyer used? Also where we can get parts for same.—E. W. Clark Motor Company, 30 E. First St., Fond du Lac, Wis.

The 1917 Dixie Flyer used a Peru axle built by the Peru Auto Parts Company, Peru, Indiana, which has since been discontinued. The parts for this car may be obtained from the Auto Gear Company, 1404 Hennepin Ave., Minneapolis, Minnesota and Sattler's Machine Shop and Works, 1601 Spring Garden Street, Philadelphia, Pa., Auto Parts Company, 2801 Preston Avenue, Houston, Texas.

### A FEW POINTERS ON CAMSHAFTS

**Q**—I would like to know if there is a one-piece counter balanced crankshaft on the market for a Chevrolet 40 engine.

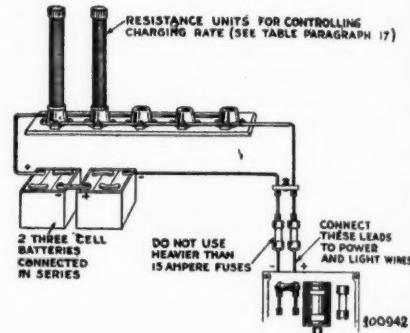


Method of charging with a rheostat

Cells to be Charged														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	1	2	2	2	3	3	3	4	4	4	4	4	4
1	1	1	2	2	2	3	3	3	4	4	4	4	4	4
Resistance Units to be Used														
525	55	5	65	7.5	7	9.5	8.5	7.5	8.5	7.5	625	5	4	3
525	55	5	65	7.5	7	9.5	8.5	7.5	8.5	7.5	625	5	4	3
Approximate Charging Rate—Engine Running														
5.4	4.25	4	7	6.5	6	8	7	6	7	6.5	4.5	3	2	1
Approximate Charging Rate from Delco-Light Battery														
100944														

Above: Table of charging currents when using resistance units

Right: Charging circuits using resistance units



run down three cells more than the others so that each time you use the set you should change the connections.

For example the first night operate on cells 1, 2 and 3. The next night operate on cells 4, 5 and 6, thus using three different cells each night. When you come to the end of your string of 16 cells, you will find that there are four cells which you can use all at the same time making an 8 volt battery, provided, of course, you have enough resistance in your rheostat to cut down the current to the proper value. In this way you will take the same current approximately from each cell. Then if, when charging, you give the battery an occasional gassing charge you will keep the cells evened up fairly well.

and if not, which is the best balance on the market to attach to a regular crank-shaft?

To our knowledge there is no one piece counter balanced crankshaft being manufactured for installation on the Chevrolet 490 engine. Regarding the best attachable balances we wish to advise that it is contrary to the policy of Motor Age Clearing House to recommend or condemn any article of automotive merchandise. We know of a few Chevrolet racers in the Chicago territory that carry special crankshafts which have been built as special individual jobs by the prominent crankshaft manufacturers, in the United States.

**Q**—Would also like to know how many stock engines in the light six class of cars have one-piece counter balanced crankshafts.

It is impossible to answer this question accurately but among the cars using counter balanced shafts of one type or the other, that is integral type or the bolted on type, are the Apperson, Essex, Nash, Templar and the 6 cylinder engine made by the Northway Engine Company, known as the model 311. There are several other engine makers and car makers who use counter balanced crankshafts but specifications on this feature are not available on each and some of the cars carrying them are in the large car class or in a class larger than what is considered a light six.

**Q**—Where can I get information on crankshaft balance?—J. M. Cagawy, 1921 E. Warne Ave., St. Louis, Mo.

This will be answered by separate letter.

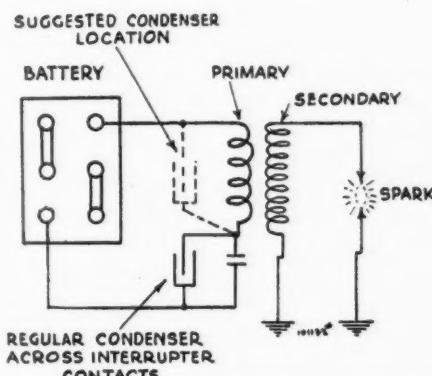
## Who Knows the Spark Plug Voltage on the Essex?

**Q**—Tell me if it will change the voltage on a secondary by bridging a condenser on the primary of an automobile ignition coil, or is the spark on the secondary circuit the same without the condenser as with it. Also tell what the voltage is approximately on the new Essex automobile.—A. F. Cross, Wilson Kan.

To answer your question we will first give an explanation of ignition principles. Referring to the diagram we have a battery sending current through the primary winding of an ignition coil also through a pair of contacts and back to the other battery terminal. Both the primary and secondary winding shown in this diagram are wound on an iron core but the two winding are insulated from each other. The purpose of the battery current through the primary winding is to magnetize the iron core. When the interrupter contacts open the current stops and the iron core is demagnetized.

This change of magnetism produces a voltage in the secondary but without a condenser the current would arc across at the points and the change in magnetism would be slow and therefore the secondary voltage would be low. To get a more sudden change in current consequently a higher secondary voltage a condenser is normally used connected across the interrupter contacts.

In this way it neutralizes or offsets the inductance not only of the primary winding but also of the wiring from battery to coil and from battery to interrupter. In your suggestion you have mentioned the possibility of the condenser connected on the primary and we have shown by dotted lines the position



The circuits of a battery ignition system are simple

that such a condenser would have. Connected across the primary winding it would effectively absorb the inductance of the primary but would not take care of the inductance of the leads.

For this reason the location of the condenser at the interrupter points is the right one to use. The ordinary ignition systems are designed with a suitable condenser so that if another one should be added it might weaken the spark at high speed where less condenser effect is required. If the ignition system is operated without any condenser the spark will be so weak that the engine will not run. In regard to the voltage of the Essex we assume that you mean the high tension voltage at the spark plug. This is practically the same on all cars and only varies due to the setting of the spark plug gaps and due to the compression. The wider the spark plug gap the more the voltage will rise before the spark jumps. You can accordingly see that we can give no definite figures as to the high tension voltage on any particular car.

## Why Bearings Need Tightening Soon After Installing

**Q**—I would like a little information in regard to fitting crankshaft bearings both in main and connecting rod. After a bearing has been fitted to the shaft either by burning, scraping or grinding, is it ready to go out and give service or should the motor be assembled and run until bearings are loosened up and then the bearings taken up again? It has been my experience that in putting in new bearings no matter how good a fit by any of the above mentioned methods they come loose in a short time. However, after I take them up again they stand up good. What is the proper speed for running a Ford bearing in a Ford burning in stand. J. W. from Kansas.

Theoretically a perfectly fit bearing requires no second adjustment in order to put it in good running shape. In the case of bearings that are casted into the case and into the rod direct the loosening up after the first adjustment or burning in, is usually due to compression of the babbitt metal. The second adjustment is not often necessary on the die cast type of removal bushings. The ideal method of fitting bearings is as you suggest.

This of course, we say is ideal especially for the cast in type of bearings but is not necessary on the die cast bushing type of bearings. Some mechanics burnish the bearings after they have been run in, in order to compress the babbitt but as this is a hand process it is doubtful whether enough pressure is applied to be of any great value to the bearings. In conclusion we would say that disassembly and second tightening is the best way to insure a long lived bearing. Proper speed for burning in Ford bearings is 200 revolutions per minute.

## JET INFORMATION FOR ZENITH

**Q**—I have some trouble, same as one of your subscribers in the Feb. 14 issue. Zenith carburetor fitted to an E-35 Buick, model L5 carburetor, and one on a 1917 Oakland 6 was fitted with an O4 Zenith. Jets seem correct with Zenith chart, yet engine tends to stall when throttle is opened quickly. I have 90 main jets on the Oakland and have tried 100 with no better results. Give your version of jet sizes and any advice. Economy and power are good but you have to handle throttle easy, no quick pick up.—Shackleton Garage, Shackleton, Sask., Can.

The Zenith recommendation for the E35 Buick, is an L-5 carburetor with a 19 choke. A number 85 main jet and number 90 compensator and a number 45 idling well. The recommendations for the 1917 Oakland six-cylinder models are number 18 choke, number 90 main jet, number 90 compensator and number 45 well. We would suggest that you install in each of these cars a hot spot of the replacement type that may be installed in the inlet manifold. Name of firms who can supply you with these hot spot devices will be supplied by separate letter. If sufficient heat is applied to the manifold there is no reason why the jet equipment recommended by the factory and the venturi equipment should not give excellent results both on running and acceleration.

## Cost of Charging Batteries With Tungar Rectifier

**Q**—We would like to know if it would be cheaper to charge batteries with a ten battery Tungar rectifier than it would with a one-quarter horse power electric motor and a Ford generator. We have the Tungar rectifier and do not have enough batteries to keep the line full or even three-fourths full all the time. We have 110 volts A. C. current for power at 12c per K.W.H. If it is cheaper to operate the  $\frac{1}{4}$  horse power motor and generator we would like information in regard to connecting this outfit and the kind of ammeter to be used. Would also like to know how to regulate the amount of current going to the batteries.—Daniel G. Reid, Box No. 13, Campbellstown, Ohio.

In the April 26, 1923, issue of MOTOR AGE we showed, in the Clearing House section a curve which gives the efficiency of a 10 battery Tungar rectifier with various numbers of batteries on charge. With one battery only on charge the efficiency was shown to be about 30 per cent. When two batteries are on charge the efficiency is up to about 45 per cent, while when 10 batteries are on the line the efficiency is up to 75 per cent. If we consider on the other hand the operation of a motor and generator for charg-

ing one battery at a time we have to multiply the two efficiencies together to get the total efficiency.

For example if we assume that the motor and generator are each 70 per cent efficient then the combination will be 49 per cent efficient. Small machines of this kind do not usually have a very high efficiency so we feel that only in the case where you have one battery to charge would the small motor generator be more efficient.

Therefore if you can have two or more batteries on the line at a time the Tungar rectifier will be the best device to use. In regard to the construction of the motor generator set there is not a great deal to say. It would be necessary to have a motor which would drive the generator in the same direction that it is driven on the car, which is clockwise from the drive end.

The ordinary  $\frac{1}{4}$  horse power motor would run at a little less than 1800 r.p.m. which would be all right from the generator standpoint and the current regulation would be obtained by means of shifting the third brush. With a set of this kind eight amperes would probably be a suitable charging rate.

## Holes Drilled To Lubricate Valve Stems

Q—I have here in the shop a 1916 four cylinder Studebaker and the valves keep sticking. I can clean them up good and it won't run over 400 miles before they are stuck up again. They seem to rust. Can you tell me what to do to stop it?—New York Subscriber.

On advice of the local Studebaker Service Organization we would suggest that you remove the cylinder block and drill two  $\frac{5}{8}$  inch holes through the base so as to make communication between the crankcase and the valve tappets in the cylinder block. The location of these holes is roughly illustrated at Fig. 146. The purpose of course is obvious as it is intended to conduct the oil mist from the crankcase up into the valve compartment.

It will be noted that at each end of the cylinder block on the valve side there is a large breather hole in the block casting. To get best results from the lubrication method outlined it will be necessary to shellac a large piece of felt on the inside of the block to obstruct these holes. This will prevent leaking of the oil from the valve compartment of the cylinder block.

### Possible Reasons for Excessive Oil Consumption

Q—This car uses a lot of oil. I put in a new set of Stark oil rings and it don't seem to help much. What you advise to do and what size should the oil pipe holes be? They look to be too big.

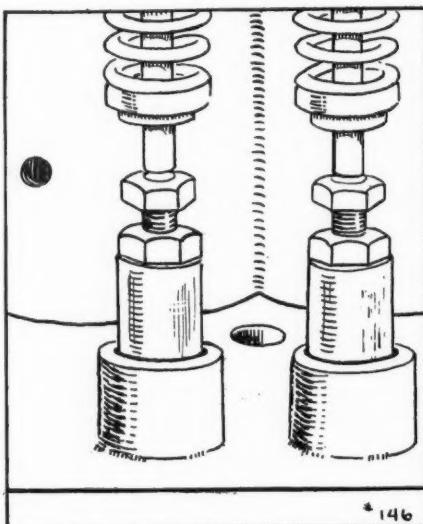
The first essential is that the cylinder bores be perfectly circular and smooth. The second requisite is that the rings be a good fit both in the piston and in the cylinder. Assuming that the rings and piston and cylinders are in good condition the next points to cover to trace cause of over oiling are as follows: Examine carefully the oil supply holes in the distributing pipe in the crankcase. Oil holes in this pipe should be not larger than  $3/64$  of an inch in diameter. The pipe itself should be so located that the jet of oil coming from these holes should not strike the connecting rod but should be directed into the trough of the sub base without touching the rod, or touching it as little as possible.

In other words direct the oil to the trough and not to the connecting rod. There is no possible method of locking the pipe and if caution is not exercised it is possible to turn it 360 degrees and thus get the oil holes in a position where they throw the oil directly on the revolving connecting rod crank pin bearings.

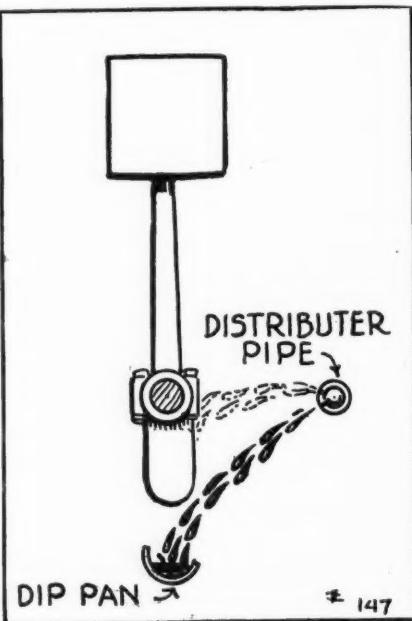
### Reduced Compression Will Reduce Knocking Tendency

Q—The car don't run 300 or 400 miles before it knocks with carbon but there is never much in it. What would you advise to use in it ethol in gas or Benzol.

Both of your suggestions are very logical and should give good results pro-



Drill  $\frac{5}{8}$ -in. hole in base of block behind pushrods as indicated



Misdirected oil stream hitting crank will send too much oil to cylinder walls

viding the fuels mentioned are obtainable in your vicinity. We would suggest that you remove the top water header from the cylinder block. With this done you will note that there is a plug over each cylinder which should be removed. Each one of these plugs carry from the inside a pointed projection which enters the combustion chamber. Accumulation of a small amount of carbon on this point may cause preignition although a small amount of carbon is present. The cure is to entirely remove this projection from the caps mentioned. Do this for the plug on each of the four cylinders. If this does not eliminate entirely the preignition remove each of the valve port plugs and chuck them and take a light cut from them by turning the bottom slightly concave so that the center of the bottom of the cap is approximately  $3/32$  deeper than the outside.

## When the Wrist Pins Are Too Big

Q—in fitting new standard size wrist pins in a piston where there are no bushings what should be done when the wrist pin will not go in.

The holes in the piston should be enlarged with an expansion reamer.

### Lapping Cylinder With New or Old Pistons

Q—in some books on repairing automobiles it states that new pistons should never be used in lapping the cylinder to size. These books claim that an old piston or some other device should be used. Then in another book it says, "Lap the new piston in until the proper clearance is obtained." Which method is right?

One reason for not using the new piston at first is that usually an oversize piston is used and it cannot be pushed all the way through the cylinder bore. For this reason it is desirable to use an old piston or some lapping device until the bore is large enough so that the new piston can go in. On the other hand it is also possible to insert the new piston part way for at the ring lands the piston is smaller than it is at the skirt.

However, if lapping compound is then used to make the large piston go in to the cylinder bore the metal will be worn away most where the piston starts in while at the same time the metal will be worn away from the piston. There will then be some tendency to get away from a true cylindrical surface.

The best way is probably to use an old piston or lapping device until the cylinder bore is large enough so that the new piston can be forced through. Then lapping compound can be used in connection with the new piston until the proper clearance is obtained.

In checking the clearance the lapping compound should be washed off and oil used on the piston while a thickness gage is used to check the clearance between the piston and the cylinder wall. In fitting regular cast iron pistons in a Ford engine for example the piston should go in freely with a .003 inch thickness gage and should go with difficulty when a .004 inch gage is used.

### Valve Timing on a Stationary Engine

Q—When should the exhaust valve close on a 7 h.p. gas engine which runs about 400 r.p.m. It has a  $6\frac{1}{2}$  inch bore and 8 inch stroke. The fly wheel is 34 inches in diameter and the connecting rod is 22 inches long.—Wisconsin Reader.

While we cannot give the exact figures we believe that it will be close enough if the exhaust valve closes either on top dead center or about ten or fifteen degrees after top dead center. You will probably find that the meshing of the timing gears is such that if the exhaust valve is timed wrong it will be far enough off so that you can easily notice it.

## Timing Chandler Magneto and Camshaft

Q.—Would you please tell me the proper way to time a Chandler six, both camshaft and magneto. Allen C. Angell, Harbor Springs, Mich.

Firing order on the 1916 and 1914 Chandler is as follows: 153624. The exhaust valves are number 1-3-5-7-9-11 counting from the front of the engine. The exhaust valve was timed to close  $1\frac{1}{2}$  inches on the flywheel past dead center on the same stroke. Top dead center may be determined by turning the flywheel until the marks on the flywheel line up with the marks on the gauge. Removal of the large cover plate on top of the flywheel housing underneath the upper floorboard will enable one to find the marks without any difficulty.

When the T. D. C. mark on the flywheel and gage or pointer are opposite each other, one piston is at top center. With the valves closed the clearance between the valve plunger and valve stems would be .004 of an inch with the motor hot. To check the setting of the camshaft remove the front cover over the chain compartment exposing the timing sprockets and the chains. With the camshaft in proper relation to the crankshaft the punch marks on both sprockets will line up with the sprocket centers.

The two points in question being on the edges of the sprocket nearest one and other. Timing the magneto may be checked by bringing number one piston to top dead center and removing the oblong plate between the two poles at the magneto exposing the magneto armature. When properly timed the armature should be half opened. Should the position of the armature need to be changed loosen the magneto coupling which is a taper fit on the magneto shaft by striking it a sharp quick blow.

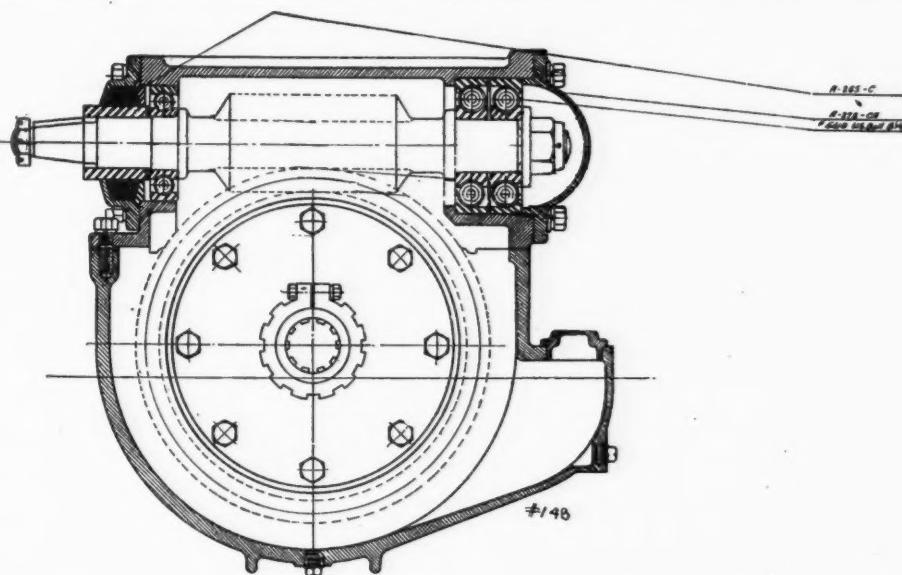
This will loosen it so the magneto shaft may be turned by exerting pressure on the distributor at the rear of the magneto, under the distributor block when the coupling should be driven back in position again. Do not, under any circumstances touch the armature with any object liable to injure the winding. The magneto should be so timed that the interrupter points have just started to open when the piston is on top dead center with spark fully retarded.

### NO MONOTONY HERE

Q. We have a Ford car which knocks on a hard pull or when the throttle is suddenly opened. It has two different knocks. One is a thump and the other is a sharp knock similar to a carbon knock. When the carbon is cleaned out it helps some but does not cure it. We are using Red Crown gasoline and Veedol motor oil. Do you think it would pay us to change to some other gasoline and oil? This Ford will make better than 40 miles an hour on a hard road and does not knock at all at this speed. What is the best remedy for a fuel knock? W. E. Beimfohr, Manitowoc, Illinois.

We believe that this is a combination

## Taking End Play from Worm Drive on Wilcox Truck



Q.—Will you please give me the correct adjustment of a worm drive rear axle on a model C 2½ ton Wilcox truck, position of worm shaft ball bearings, etc.—Alex Leonard, c/o Standard Oil Company, Ironwood, Michigan.

The following information is received from the Wilcox Truck Co., Minneapolis, Minn. The model C 2½-ton truck contains the Wiscon 900-C axle. This is a worm drive type. In regard to taking up the play in the worm and making adjustments on the worm bearings, we wish to give the following instructions: If there is considerable play in the two rear worm bearings insert shims between the

bearings and the inside race.

This play develops as the bearing wears. The rear cap should be machined at the outside flange sufficient to cause the inside flange on the cap to rest firmly against the inside race of the bearings. If this permits the cap to fit too snugly against the bearing, shims can be used to fit properly. In regard to wheel bearings, this play is taken up by fitting a washer between the wheel bearings and the hub or by fitting a plug in the axle shaft at the differential end. The lay out of the worm support and worm itself are illustrated at Fig. 148.

of main bearing knock and piston slap. It might pay you to remove the piston and if you have micrometers take the diameter of the piston and cylinders. If the difference is more than .006 inches or .007 inches it is possible that this is the cause of the trouble. It might then be advisable to lap in pistons which are .005 inches oversize. If you do not have micrometers you can use a thickness gage between the piston skirt and cylinder wall and see how much clearance there is.

With the present day fuel however, it is possible even on new cars to get some piston slap when the throttle is suddenly opened wide. This is a rather hard test for any car. The gasoline and oil which you are using are both good but any commercial gasoline on the market today has some tendency to cause a fuel knock. If you are able to buy benzol you may try a mixture of half gasoline and half benzol, as this reduces the tendency of the fuel to cause a knock or piston slap. We would suggest having your main bearings tightened and then operate the car without suddenly opening the throttle. You can get results which are just as good or better by opening the throttle gradually.

### OIL AFFECTS GAGE READING

Q. Please answer me by return mail the following questions: I have an Auburn car 1922 model with a Continental 7-R motor run 9000 miles. When the motor is cold the oil pressure goes up to 50 pounds but when it gets hot drops to about 8 pounds. The pressure valve is turned a-way down. The pressure always did run up to about 20 and 25 pounds with a warm motor up until about a week ago. Will you please tell me the cause of this and if there is any cure for it or is the motor getting oil enough. Louis G. Allen, 712 Nebraska Avenue, St. Petersburg, Fla.

The maximum oil pressure should be from 30 to 40 pounds with cold engine. At a speed corresponding to 15 miles per hour the oil pressure should be 18 pounds. The cause of the lack of pressure and the drop in pressure as the engine warms up is due to one of two causes, either loose bearings or an oil that is too thin. Regarding thin oil we mean that you are using an oil that is not suitable and that has not a high enough flash point to prevent the heat from thinning it out and burning at engine temperature. Any authorized Auburn service station can quickly examine the bearings and tell whether or not they are too loose to maintain the pressure.

# How Fire Laws Protect the Garage Owner

*Compliance With Regulations That Appear Stringent Often Saves the Business From Ruinous Hazards*

By WELLINGTON GUSTIN  
*of the Chicago Bar*

THE garagekeeper's first consideration is his garage. He can't do business, he can't utilize the many progressive ideas and formulas presented him by his trade journals, his business associations and papers; he can't adopt, employ and carry out the many plans of manufacturers, efficiency experts, and what not, all calculated to aid him to develop and hold business, unless he has a proper place to do business, and unless he preserves that place—his garage. For a fire may so disarrange his plans and injure his business that his profits for years may be wiped out. No fire insurance can cover all his losses. In case of a fire covered by insurance, although he might be able to recover for the actual value of all tangible property, the good will of the business, the work of rebuilding and re-establishing himself might have been saved, and should have been saved, by those acts of precaution which cost him considerably less time in time, thought and money.

### *Garagekeeper Protests*

A garagekeeper in Illinois recently protested against a requirement of the state fire department intended to make his garage more safe from fires, and more particularly, other surrounding property safe. Perhaps this garagekeeper did not realize that his own negligence in operating his shop might have been the direct cause of loss to surrounding building owners, for which loss he could have been held liable should loss have resulted from the unsafe condition pointed out by the fire marshal.

Now, the garagekeeper's business is a bit more hazardous than the ordinary business, due to the greater likelihood of fires. This means that he must use greater precaution in the conduct of his business, must use more safeguards, and get his business right from the foundation up. This foundation is first in the building. With the proper building, he can then employ his best thought in surveying the conditions entering into his particular shop and thus reduce his fire hazard to a minimum. The less fireproof his building, the greater care and thought he must employ for protection.

But as to outside interference in how he constructs and conducts his shop, he is entitled to the equal protection of the laws as well as any other business man. State laws may not be discriminative against him any more than they are permitted to discriminate in his favor. The Garagekeeper's Act of 1917 in Illinois was held by the Supreme Court to be invalid and unconstitutional because it was class legislation. It singled out the garagekeeper as a class and gave him

an advantage in the way of a lien not given other repairmen in the same class. This is not permitted the legislature to do, so the garagekeepers in Illinois had to go to the legislature and have another lien law passed that gave a repair lien to all who repaired any kind of personal property for pay.

### *Fire Inspector's Authority*

But it might not be well, for his own sake alone, for the garagekeeper to get too jealous of his rights when he thinks the State Fire Marshal and his deputies and assistants are requiring more of him as to how he builds and keeps his premises, as regards fire hazards, than is required of his brother business man. For the very requirement may save him not only business losses, but losses of third parties.

Of course, there are times when a fire inspector may abuse his powers and authority. In such cases a party aggrieved or denying the right of the marshal or his assistants to insist on an order issued against him, or denying the justice of a charge, has a right to appeal to a judgment of a court on the facts. It is conceivable that the order of the marshal might amount to an injunction against a garageman whose building is old and cannot be made to conform to safety conditions, yet due to location it is hazardous only to the garagekeeper. Taken to the courts, the decision in such a case will be to permit the garageman to continue in business if possible.

What are the duties and powers of a state fire marshal? They are, first, to prevent fires, and to enforce all the laws relating thereto. In addition, he must execute or enforce the laws relating to the storage, sale and use of combustibles and explosives; he must enforce the laws in suppression of arson, and investigate the cause of fires, their origin and circumstances. Then there are numerous other duties assigned to his department.

### *The Inspector's Duty*

Now if the state fire marshal, his chief assistant state fire marshal, or deputy fire marshal, upon inspection finds a building or other structure, which for want of proper repair, by reason of age and dilapidated condition, defective or poorly installed electrical wiring and equipment, defective chimneys, defective gas connections, defective heating apparatus, or "for any other cause or reason" is especially liable to fire and which structure is so situated as to endanger other buildings or property, such officer is in duty bound to order such building or buildings to be repaired, torn down, demolished, materials removed, and all dangerous conditions remedied. And if

an officer finds upon any premises any combustible or explosive material, rubbish, rags, waste, oils, gasoline or inflammable conditions of any kind, dangerous to the safety of such buildings or property, he is required to order such materials removed and the conditions remedied. As a rule any such order must be complied with within a period fixed in the order.

In addition, if the state fire marshal or his assistants find on the premises in any building conditions that are a menace and dangerous to the safety of life and limb of the occupants of the building or adjacent buildings, they have the power to issue orders requiring a removal and remedying of the conditions forthwith, and one not complying therewith is ordinarily held guilty of a misdemeanor.

Now there is an appeal, as has been stated, from all of such orders to the courts, but should one fail on appeal the original penalty attaches. In most states a penalty of from \$10 to \$50 a day is given one who refuses to comply with these orders, running each day of neglect to comply. But such penalty does not continue while an appeal is being had. Again, if one fails to comply with an order the officer giving the order is empowered to remedy the condemned condition and charge the costs to the owner or other responsible party.

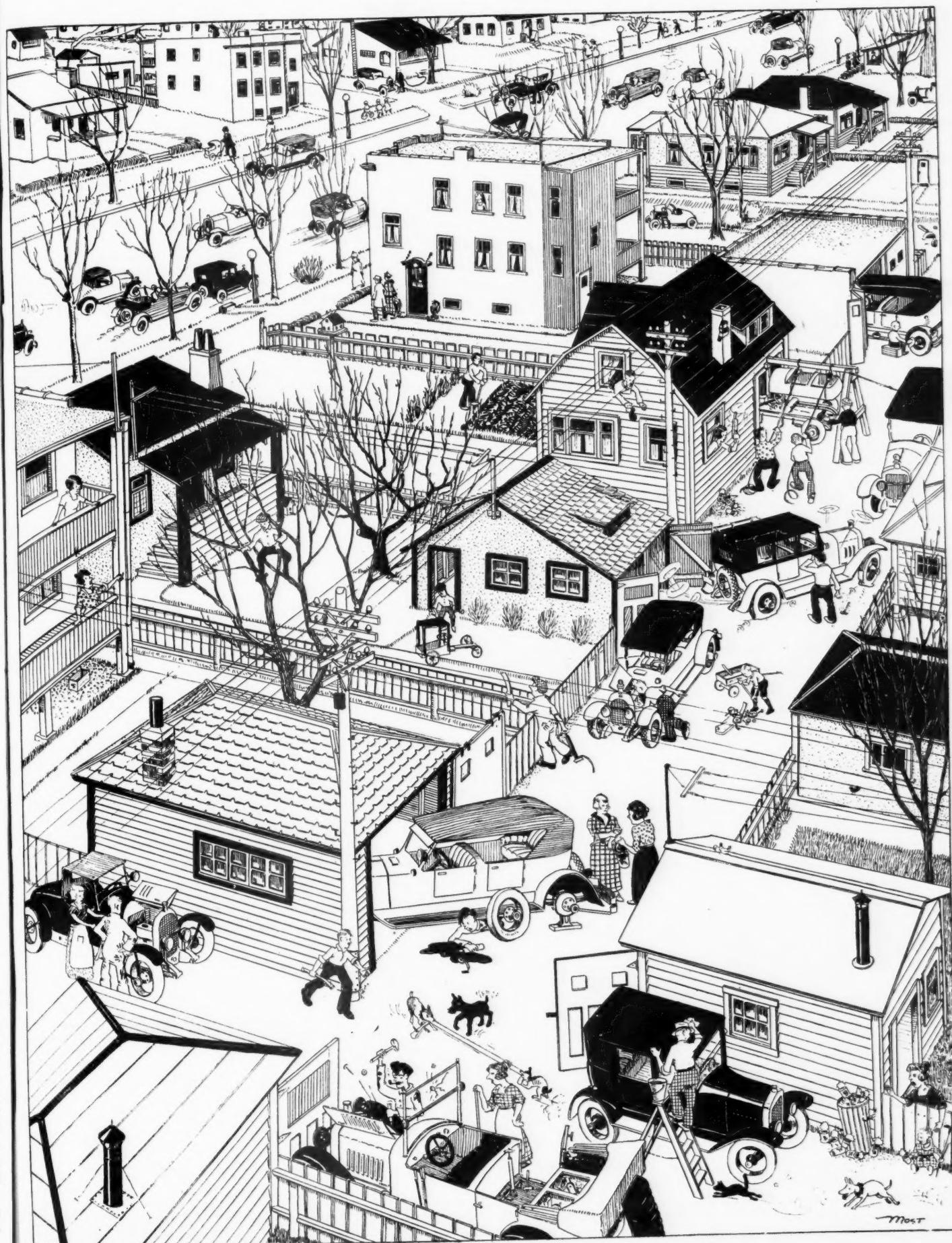
### *Laws Highly Beneficial*

The fire prevention laws are highly beneficial to our modern complex living and business conditions. Prospective garagekeepers would do well to consult, where possible, with an experienced fire marshal or a capable assistant. Undoubtedly good ideas as to conducting a garage business with fire hazards reduced to a minimum should be obtained, all of which should reassure the prospect and aid him in getting his business started on a solid foundation. And the established garagekeeper must be alert to see that he keeps his hazards down.

Outside the fire prevention laws every garagekeeper is required as a matter of fundamental laws to keep his place free from such conditions which might result in loss to the public, or some particular member of the public. For when neighbors are able to show a court that a business is conducted in a manner inimical to their safety and health, as by the likelihood of fire or explosion, obnoxious gases and noises issuing forth from a garage, the same may be abated as a nuisance.

So, have the base of your business solid, that your profits may not be endangered daily.

*Puzzle: Find the Service Salesman—By Carl Most*



# SQUEEKS & RATTLES

Pretty soon, comes the first ball game, then the Summer Service Issue, then the Indianapolis race and then, the second installment on the income tax.

## Driving at Night

*Driving at night!*

The moonlight softly falling  
A thwart the road, through silent, sleep-locked trees.

*Slipping along!*

The wakeful frogs are calling,  
Their bell-toned chorus floating on the breeze.

*Between the fields!*

The frost-freed sod is waking,  
The unborn wheat is turning in its cell.

*Joyfully on!*

The Earth-born man is slaking  
His Nature-thirst at Spring's enchanted well!  
—Arthur J. McElhone, in *The Chicago Tribune*.

Phineas Shark, the eminent statistician and mathematician, writing in "The Crow's Nest" department of the Detroit Motor News, estimates that all fashionably dressed flappers who take rides in open cars in the winter are 87.4 per cent goose flesh.

What, then, may we ask, is the other 12.6 per cent?

## Politics

Bill Bryan, in an interview recently said, "The entire Republican party is on trial."

"That," comments R. H. L. in the Chicago Tribune, "That makes it bad. With the entire Republican party on trial and the entire Democratic party under suspicion and a large part of the church saying there is no hell and Henry Ford about to get Muscle Shoals, we don't care whether we get our pants pressed this week or not."

It is said that in the play, "Kelly's Vacation" at the Adelphi, Chicago, there is entirely too much cussing.

The play, strange to relate, is not based upon used automobiles.

## "The Times Changeth"

"No Hitching Here," the sign once read,  
(Yes, backward we are harking)  
But since the old town forged ahead.  
The legend reads, "No Parking."  
—Detroit Motor News.

"Some women," complains a dealer who is suing his wife for divorce, "are as hard to get rid of as used cars." Another "problem" threatens.

## "Help! Help!" in Poetry

Help, help, help, help, help, help!  
Help, help, help, help, help, help—  
Help, help, help, help, help, help,  
Help, help, help, help, help, help!

A letter received by an accessory dealer reads, "Please send me a carburetor for our Ford. Have the thing adjusted before you send it, so I can screw it on and have no trouble with it."

Now, all some guy has got to do is perfect a meat cutter for attaching to the fan so that tourists can have their hash made for them as they go.

A hen can set still and earn a living, but men can't.

"Well, here's where the boss gives me a raise," said the piston as bottom dead center was passed.—Castle Nut.

## Please, Bonehead, Send Us Something!

### SQUEEKS & RATTLES

Lew Brication, con.

Sir:

You notice particularly that I am not using any endearing terms this time, and there's a reason, I wrote you the nicest letter under date of Jan. 7th. '24 not intended as a contrib. but just a newsy letter, I spent hours making it a good one, after my effort to be nice you just plainly ignored me, and I'm mad clear through. So just yell your head off for help, it doesn't bother me. I just gloat over the fact that you have to yell for it. I can plainly see that the "SQUEEKS & RATTLES" are going to the dogs since I quit you flat. Formerly squeaks belonged to anything extremely dry and rattles to a Ford, therefore—a Ford being a young river and dry at the same time, well in other words its about through isn't it?

Leaving all jokes aside, I did write you at above date but received no response either one way or the other so I am just now on the verge of self destruction, and unless I hear from you this time I will haunt you the rest of my life.

However I want to say one thing, (whether it be any credit to you coming from me or not) the very first thing I look for in the M. A. is your page, and I have long since given up hope of seeing the beautiful contribution I donated without results.

But "Lew" should you ever be so urgently in need of help that you will step down of that high perch you are now evidently roosting on and talk to poor neglected me, I got some stuff here I'd like to do.

Owing to the fact I haven't a grievance against any man woman or child in the world and you no doubt belong to one of those classes, I will call it all off,

With the kindest regards

BONEHEAD.

## Fable

Once upon a time, there was a motorist who drove his car 500 miles on a tour to see his wife's folks and when he came back, he didn't write a touring story and submit it to The Saturday Evening Post.

What is it the height of, when an automobile mechanic will hang out a shingle reading, "Ray's Automobile Repair Shoppe"?

On second thought, the idea isn't a bad one—the only difference between an automobile repair "shoppe" and a ladies' face and hair repair "shoppe" is that in the automobile shop, they remove "permanent waves" while in the beauty shop, they install them or whatever it is.

A lady goes into a beauty shop, has an attendant throw a pile of mud in her face, pull and bat it about, grind out the wrinkles with an electric iron, burn her hair into a crisp "installing" a permanent wave and pays 25 bucks for it.

Then she goes around the corner and because some poor, hard working mechanic happened to put his greasy hand on the fender of her car, she thinks she ought to have a 50 per cent reduction in the bill for an engine overhauling.

LEW BRICATION.

April

Ship.  
Wt.

AMER  
2985  
3175  
3260  
3310  
3190  
3470

ANDE  
2650  
2675

2725  
2875  
2925

2975  
APPE  
2885

3250

4050  
4300  
3485  
4500

AUBU  
2642

2830

2885

3165  
3375  
3620

BARL

2750  
2800  
3100  
3150

BUIC  
2570  
2680  
2845  
2955

3300  
3455  
3675

3470  
3645  
3605  
3770

4020

CADI

4190  
4280  
4200  
4270  
4370

4480

4600  
4530  
4640

4560

4640

4020

3020  
3050  
3200  
3380

3400

3975

4200

CHAI

2965

2980

3060

2900

3300

## Prices and Weights of Current Passenger Car Models

Ship. Wt. Pass. Body Style	Ship. Wt. Pass. Body Style	Ship. Wt. Pass. Body Style	Ship. Wt. Pass. Body Style	Ship. Wt. Pass. Body Style
<b>AMERICAN</b>	<b>CHANDLER</b>	<b>DUESENBERG</b>	<b>H C S</b>	<b>HUDSON</b>
2985 2-p Roadster \$1,950	2945 2-p Roadster \$1,695	3200 2-p Roadster \$6,500	3445 4-p "4" \$1,425	3360 4-p Touring \$2,250
3175 2-p Sp. Roadster 2,050	3130 4-p Roadster 1,685	3500 5-p Phaeton 6,250	3445 7-p "6" 1,500	3780 5-p Touring 2,650
3260 5-p Touring 1,695	3160 5-p Touring 1,485	3750 7-p Phaeton 6,750	3435 5-p Coach 1,550	3950 4-p Coupe 3,350
3310 7-p Touring 1,760	3220 7-p Touring 1,635	3750 4-p Sp. Phaeton 6,500	4010 4-p Sedan 3,350	
3190 4-p Sp. Touring 1,885	3250 4-p Royal Dispatch 1,785	4000 4-p Coupe 7,500		
3470 7-p Sedan 2,550	5-p Sedan 1,895	4350 7-p Sedan 7,800		
3310 5-p Brougham 2,195	7-p Sedan 2,095			
	3600 7-p Sedan 2,385			
	3380 5-p Chummy Sedan 1,745			
	3480 5-p Metropolitan Sedan 2,270			
	3585 7-p Limousine 2,995			
<b>ANDERSON</b>	<b>CHEVROLET</b>	<b>DURANT</b>	<b>HUPMOBILE</b>	
"41"				
2650 5-p Touring \$1,195	1715 2-p Sup. Roadster \$490	2235 2-p Roadster \$1,040	<b>2650</b> Roadster \$1,175	
2675 4-p Sp. Touring 1,445	1795 5-p Sup. Touring 495	2255 5-p Touring 890	2700 2-p Spec. Roadster 1,195	
2-p Coupe 1,425	4-p Sup. Coupe 725	2395 5-p Sp. Touring 1,090	2705 5-p Touring 1,175	
2725 4-p Coach 1,495	2-p Sup. Utility Coupe 640	2495 5-p Coupe 1,349	2770 Spec. Touring 1,195	
2875 5-p Sedan 1,695	2095 5-p Sup. Sedan 795	2405 Business Men Coupe 1,185	2800 3-p Coupe 1,415	
2925 5-p Sp. Sedan 1,895		2605 5-p Sedan 1,365	2925 4-p Coupe 1,595	
"50"		2670 5-p Touring Sedan 1,465	2975 5-p Sedan 1,750	
2975 7-p Touring 1,595			2875 5-p Club Sedan 1,425	
<b>APPERSON</b>	<b>CHRYSLER</b>	<b>ELCAR</b>	<b>JEWETT</b>	
"6"		"4"		
2885 5-p Phaeton \$1,395	2650 4-p Roadster \$1,525	2560 5-p Touring \$995	<b>2460</b> Roadster \$1,065	
5-p Sp. Phaeton 1,600	5-p Touring 1,335	2885 5-p Demi Sp. Touring 1,095	2620 5-p Touring 1,065	
3250 5-p Sedan 1,995	5-p Phaeton 1,395	2641 5-p Sportster 1,195	2680 Spec. Touring 1,220	
5-p Sp. Sedan 2,195	5-p Std. Sedan 1,625	2900 5-p Sedan 1,425	2935 5-p Sedan 1,495	
	5-p Spec. Sedan 1,895	2981 5-p Sp. Sedan 1,625	3025 5-p Spec. Sedan 1,695	
	5-p Brougham 1,795	Brougham 3 d. 1,265	5-p Brougham 1,325	
		3 door 1,395		
<b>AUBURN</b>	<b>CLEVELAND</b>	<b>"Light 6"</b>	<b>JORDAN</b>	"K" (120 inch)
"6-43"			2980 2-p Playboy	Roadster \$1,850
2642 5-p Touring \$1,095	2617 3-p Coupe 1,245	2600 5-p Demi Sp. Touring	2935 5-p Touring 1,775	
5-p Special Touring 1,295	2627 3-p Spec. Coupe 1,345	2600 5-p Touring 1,220	3310 5-p Brougham 4 d. 2,385	
5-p Sp. Touring 1,365	2717 5-p Sedan 2 door 1,295	2690 5-p Sp. Touring 1,420	3250 4-p Victoria 2,385	
2830 5-p Coupe Touring 1,595	2717 5-p Spec. Sedan 2 d. 1,395	2900 5-p Sedan 1,650		
5-p English Coach 1,845	2910 5-p Sedan 4 door 1,395	2981 5-p Sp. Sedan 1,850		
2885 5-p Sedan 1,695	2922 5-p Spec. Sedan 4 d. 1,495	2779 5-p Brougham 1,490	<b>3125</b> 4-p Blueboy Touring 2,095	
"6-63"		2829 5-p Sp. Brougham 1,620	3525 5-p Sedan 2,585	
3165 5-p Touring 1,695			3450 7-p Sedan 2,785	
3375 5-p Sp. Touring 1,935				
3620 5-p Sedan 2,445				
5-p Brougham 2,245				
<b>BARLEY</b>	<b>COLE</b>	<b>"6 DeLuxe"</b>	<b>KING</b>	(120 in. wheelbase)
"6"			3428 2-p Sportster	\$1,995
2750 5-p Touring \$1,395	3695 4-p Volante Touring \$2,175	2007 5-p Touring 1,395	3428 4-p Foursome 1,595	
2800 5-p Sp. Touring 1,495	3765 7-p Westchester	3250 5-p Demi-Sport 1,495	3528 5-p Touring 1,595	
3100 5-p Sedan 1,850	Touring 2,175	3300 5-p Sportster 1,595	3645 5-p Coupe 2,200	
3150 5-p Sp. Sedan 2,250	3890 4-p Imperial Coupe 2,750	3380 5-p Sedan 2,195	3875 5-p Sedan 2,400	
	3950 5-p Broquette Sedan 3,075	3675 5-p Sp. Sedan 1,995	3400 4-p Road King Sedan 1,495	
	4090 7-p Royal Sedan 3,075	3380 4-p Brougham 1,995	4-p Sedanette 1,995	
	4150 7-p Royal Limousine 3,175			
<b>BUICK</b>	<b>COLUMBIA</b>	<b>ELGIN</b>	<b>(124 in. wheelbase)</b>	
"4"			3428 2-p Sportster 1,995	
2570 2-p Roadster \$935	2460 5-p Touring \$1,095	2940 4-p Sportsman \$1,895	3428 4-p Foursome 1,795	
2680 5-p Touring 965	2460 5-p Spec. Touring 1,195	2985 3-p Coupe 2,145	3528 5-p Touring 1,795	
2845 4-p Coupe 1,395	2810 5-p Sedan 1,775	3250 5-p Sedan 2,345	3645 5-p Coupe 2,400	
2955 5-p Sedan 1,495			3875 5-p Sedan 2,625	
"6" (120 Wheelbase)	<b>CUNNINGHAM</b>	<b>ESSEX</b>	3400 4-p Road King Sedan 1,795	
3300 2-p Roadster 1,275	7-p Touring \$6,300	2100 5-p Touring \$850	Sedanette 2,295	
3455 5-p Touring 1,295	4-p Sp. Touring 5,800	2250 5-p Coach 975		
3855 5-p Sedan 2,095	4-p Coupe 7,150			
3675 5-p Dbl. Serv. Sedan 1,695	6-p Sedan 7,650	<b>FLINT</b>		
"6" (128 Wheelbase)	<b>DAGMAR</b>			
3470 3-p Sp. Roadster 1,675	3800 Sp. Touring \$3,500	Sp. Roadster \$1,630		
3645 7-p Touring 1,565	4200 Sedan 4,500	Touring 1,295		
3605 4-p Sp. Touring 1,725		Sp. Touring 1,695		
3770 4-p Coupe 1,995		Coupe 1,995		
3-p Country Club Coupe 1,945	2650 3-p Man O'War	Sedan 2,085		
5-p Sedan 2,235	2910 4-p Legionnaire Tour. 1,495			
2750 7-p Sedan 2,285	2750 5-p Phaeton 1,395	<b>FORD</b>		
4020 5-p Brougham Sedan 2,235	5-p Sedan 1,885	1385 2-p Runabout \$265		
5-p Town Car 2,795	3100 5-p Berline Sedan 1,995	1475 5-p Touring 295		
	5-p Brougham 1,495	1535 2-p Runabout \$350		
<b>CADILLAC</b>	<b>DAVIS</b>	1625 5-p Touring 380	3360 7-p Touring 1,885	
"81"	"71"	1730 2-p Coupe 525	3670 7-p Tourster 2,385	
4190 4-p Roadster \$3,085	2650 3-p Man O'War	1915 5-p Sedan, Fordor 685	Encl. Speedster 2,785	
4280 7-p Touring 3,085	2910 4-p Legionnaire Tour. 1,495	5-p Sedan, Tudor 595	Coach Sedan 3,375	
4200 4-p Sp. Coupe 3,085			Berline Sedan 3,485	
4270 2-p Coupe 3,875	3200 4-p Brodun 1,995	<b>FRANKLIN</b>		
4370 5-p Sp. Coupe 3,950	3250 5-p Berline Sedan 2,295	2580 5-p Touring \$1,950		
4480 5-p Sedan 4,400		2710 3-p Coupe 2,750		
4610 7-p Sedan 3,585	2513 2-p Roadster \$865	2730 5-p Sedan 2,850		
4600 5-p DeLuxe Sedan 4,150	2-p Spec. Roadster 1,060	2655 5-p Demi-Sedan 2,250		
4530 Town Brougham 4,600	2-p Spec. Roadster 1,060	2835 2-p Brougham 2,850		
4640 Limousine 4,600	2610 5-p Touring 895	Tour. Limousine 2,950		
4560 Suburban 4,500	5-p Spec. Touring 1,060			
4640 7-p DeLuxe Suburban 4,250	1,060	<b>GARDNER</b>		
4-p Victoria 3,275	1,060	2500 3-p Roadster \$895		
	1,060	2500 3-p Radio Spec. 1,085		
<b>CASE</b>	<b>DODGE BROTHERS</b>	2680 5-p Rad. Spec. Tour. 1,145a		
"X"		2640 3-p Coupe 1,145		
3020 3-p Roadster \$1,750	3050 5-p Sedan A 1,385	2850 5-p Sedan 1,445		
3050 5-p Touring 1,790	5-p Spec. Sedan 1,545	3230 7-p Sedan 1,445		
3290 Sp. Phaeton 2,230		3395 7-p Sedan 1,565		
3380 4-p Suburban Coupe 2,480	4115 7-p Touring \$3,950	3775 5-p Brougham 1,335		
3400 5-p Sedan 2,575	4193 4-p Coupe 4,985	2790 5-p Sedan 1,335		
"Y"	5-p Sedan 5,550			
3975 7-p Touring 2,475	4310 7-p Sedan 5,800	1690 5-p Touring \$630	<b>LEXINGTON</b>	"Minute Man"
4200 7-p Sedan 3,325	4120 4-p Pasadena Sedan 4,150	1800 2-p Coupe 750	3120 2-p Skylark Roadster \$1,895	
		2023 5-p Sedan 895	3489 5-p Lark Sp. Roadster 2,145	
<b>CHALMERS</b>	<b>DORT</b>		3195 5-p Touring 1,895	
			3365 5-p Cal. Touring 2,195	
2965 2-p Roadster \$1,185	2595 5-p Touring \$1,095	3230 7-p Touring 1,995	3375 5-p Royal Coach 2,295	
2980 5-p Touring 1,185	2780 5-p Sp. Touring 1,245	3395 7-p Sedan 1,565	3542 5-p Sedan 2,695	
3060 7-p Touring 1,295	3010 5-p Coupe 1,385	3790 5-p Brougham 1,335	3440 4-p Brougham 2,395	
2900 5-p Sp. Touring 1,335	3845 5-p Sedan 1,595	3790 5-p Sedan 895	5-p Sedan 1,845	
3300 7-p Sedan 2,095	3020 5-p Brougham 1,535			
			<b>LAWAYETTE</b>	
			4010 7-p Touring 1,395	
			3905 4-p Torpedo 3,250	
			4210 5-p Coupe 4,300	
			4350 5-p Sedan 4,400	
			4375 7-p Limousine 4,000	
			4480 4-p Imperial Lim. 4,700	
			<b>LEXINGTON</b>	
			"Concord"	
			5-p Sedan 1,845	
			<b>LAWAYETTE</b>	
			4010 7-p Touring 1,395	
			3905 4-p Torpedo 3,250	
			4210 5-p Coupe 4,300	
			4350 5-p Sedan 4,400	
			4375 7-p Limousine 4,000	
			4480 4-p Imperial Lim. 4,700	
			<b>LIBERTY</b>	
			2900 2-p Cavalier	
			Roadster \$1,575	
			2900 5-p Cav. Touring 1,575	

For complete mechanical specifications see pages 56 and 58.

## Prices and Weights of Current Passenger Car Models

Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price	Ship.	Wt.	Pass.	Body Style	Price
LINCOLN					OAKLAND					REO					STEVENS-DURYEA				
4050	2-p	Roadster	\$3,800	2420	2-p	Roadster	\$995	3170	5-p	Touring	\$1,335	4200	2-p	Roadster	\$8,150	MAR.			
4290	7-p	Touring	3,800	2510	Sp.	Roadster	1,095	3250	5-p	Phaeton	1,545	4400	7-p	Touring	7,500	M.			
4215	4-p	Phaeton	3,800	2485	5-p	Touring	995	3225	4-p	Coupe	1,875	4250	4-p	Sp. Touring	7,750	Acme..			
4380	5-p	Coupe	4,400	2550	5-p	Sp. Touring	1,095	3515	5-p	Sedan	1,985	4600	4-p	Coupe	9,000	Acme..			
4375	4-p	Sedan	4,600	2620	2-p	Coupe	1,195	3695	5-p	Brougham 4 d.	2,235	4600	4-p	Sedan	10,000	Acme..			
4600	5-p	Sedan	4,700	2720	4-p	Coupe	1,445				4800	6-p	Sedan	9,675	Acme..				
4660	7-p	Sedan	4,900	2680	5-p	Sedan	1,395				4800	Town Brougham	10,175	Acme..					
4720	7-p	Limousine	5,100	OLDSMOBILE				3700		Roadster	\$3,200	4800	6-p	Vestibule Limou.	9,675	Acme..			
LOCOMOBILE				2145	2-p	Roadster	\$785	3500		Speedster	3,200	4800	7-p	3/4 Limousine	10,175	Acme..			
4-p	Sportif	\$7,900	2170	5-p	Touring	795	3800	5-p	Touring	3,200	4800	7-p	Cabriolet	10,175	Acme..				
5330	7-p	Touring	7,900	2320	5-p	Sp. Touring	915	4300		Sedan	4,000								
5460	5-p	Victoria Sedan	10,500	2295	2-p	Cab	985												
5265	7-p	Brougham	10,500	2410	4-p	Coupe	1,075												
5480	7-p	Tour. Limousine	9,500	2570	5-p	Sedan	1,335												
5460	7-p	Enc. Drive Lim.	10,500	OVERLAND	"91"														
5722	7-p	Cabriolet	10,750	1844	2-p	Roadster	\$495												
McFARLAN	"6"			1910	5-p	Touring	495												
4600	2-p	Roadster	\$5,400	2100	2-p	Coupe	750												
4600	4-p	Sp. Roadster	5,600	2200	7-p	Sedan	795												
4700	7-p	Touring	5,700		"92"														
4900	4-p	Coupe	6,720	2047	5-p	Red Bird	695												
5200	4-p	Tour. Sedan	6,720	2058	5-p	Champion	695												
5200	7-p	Tour. Sedan	6,810																
5200	Sp. Sedan	6,600																	
5200	Sub. Sedan	7,000																	
5100	Limousine	6,900																	
5100	Landaulet	8,500																	
5200	7-p	Cabriolet	9,000	3255	4-p	Sp. Touring	2,750												
4900	Town Car	6,900																	
	"Light 6"																		
3700	3-p	Roadster	2,500	3400	4-p	Coupe	3,275												
3700	5-p	Touring	2,500	3515	5-p	Coupe	3,450												
3850	4-p	Coupe	3,000	3565	5-p	Sedan	3,375												
3850	5-p	Sedan	3,000	3610	5-p	Sedan Limousine	3,425												
MARMON																			
3470	2-p	Speedster	\$3,095	3430	7-p	Touring	2,785												
3650	4-p	Speedster	3,095	3690	7-p	Sedan	3,625												
3575	4-p	Phaeton	2,785	3765	7-p	Sedan Limousine	3,675												
3690	7-p	Phaeton	2,895		"8" (136 inch)														
3770	4-p	Coupe	3,585	3870	5-p	Runabout	3,850												
3970	4-p	Sedan	2,985	3870	5-p	Touring	3,650												
4155	7-p	Sedan	3,985	3985	4-p	Sp. Touring	3,800												
4220	7-p	Suburban	4,285	4045	5-p	Coupe	4,725												
4100	7-p	Limousine	4,285	4226	5-p	Sedan	4,650												
4000	7-p	Town Car	4,285	4276	5-p	Sedan Limousine	4,700												
MAXWELL																			
2225	2-p	Roadster	\$875	4020	7-p	Touring	3,850												
2460	2-p	Sp. Roadster	895	4275	7-p	Sedan	4,900												
2250	5-p	Touring	875	4350	7-p	Sedan Limousine	4,950												
2470	5-p	Sp. Touring	975																
2450	4-p	Coupe	1,195																
2325	2-p	Club Coupe	995																
2450	5-p	Club Sedan	1,075																
2750	5-p	Traveller	1,585																
MOON	"A" (New Six)																		
2570	5-p	Touring	\$1,095																
	"6-40"																		
2750	3-p	Roadster	\$1,395																
2850	5-p	Touring	1,395																
2950	5-p	Sp. Touring	1,595																
3020	4-p	Coupe	1,785																
3050	5-p	Sedan	1,795																
3190	5-p	Sp. Sedan	1,995																
	"6-50"																		
2850	3-p	Roadster	1,495	3980	7-p	Touring	2,750												
2950	5-p	Touring	1,495	3930	2-p	Roadster	3,300												
3050	5-p	Sp. Touring	1,595	4135	4-p	Suburban Coupe	3,390												
3120	4-p	Coupe	1,885	4300	5-p	Sedan	3,690												
3150	5-p	Sedan	1,885	4355	7-p	Sedan	3,840												
3290	5-p	Sp. Sedan	2,095	4254	5-p	Town Brougham	3,690												
	"6-58"			4430	5-p	Berline	4,090												
3290	7-p	Touring	1,885	4130	4-p	Victoria	3,390												
3270	5-p	Sp. Touring	2,150																
3270	7-p	Sp. Phaeton	1,995																
3510	7-p	Sedan	2,585																
3590	5-p	Petite Sedan	2,685																
NASH	"4"																		
2600	2-p	Roadster	\$915																
2720	5-p	Touring	935																
2800	5-p	Sp. Touring	1,195																
2800	Business Coupe	1,165																	
3090	5-p	Sedan	1,445																
2910	5-p	Carriole	1,275																
	"6" (121 inch)																		
2930	2-p	Roadster	1,275																
2530	4-p	Sp. Roadster	1,645																
3030	5-p	Touring	1,275	2850	Roadster	\$1,500													
3330	5-p	Coupe 4 d.	2,090	2876	Touring	1,500													
3430	5-p	Sedan	2,040																

## Current Motor Truck Specifications

*(This list comprises trucks distributed on a national basis)*

Price	MAKE AND MODEL	Tons Capacity	Price	MAKE AND MODEL	Tons Capacity	Price	MAKE AND MODEL	Tons Capacity	Price	MAKE AND MODEL	Tons Capacity	Price
\$8,150				Duplex.	AC 2 <sup>1</sup> / <sub>2</sub> -3	...	Mack.	AC 6 <sup>1</sup> / <sub>2</sub>	\$5750	Service.	61 3	...
7,500				Duplex.	E 3 <sup>1</sup> / <sub>2</sub>	...	Mack.	AC 7 <sup>1</sup> / <sub>2</sub>	6000	Service.	81 4	...
7,750				F. W. D.	B 3	\$4200	††Mack.	AB 5	3400	Service.	103 6	...
9,000				Fageol.	1 <sup>1</sup> / <sub>2</sub>	3000	††Mack.	AC 7	4950	Signal.	NF 1 <sup>1</sup> / <sub>2</sub>	...
10,000				Fageol.	2 <sup>1</sup> / <sub>2</sub>	3900	††Mack.	AC 10	5500	Signal.	H 2 <sup>1</sup> / <sub>2</sub>	...
9,675	Acme.	20 1 -1 <sup>1</sup> / <sub>2</sub>	...	Fageol.	4	5000	††Mack.	AC 13	5750	Signal.	J 3 <sup>1</sup> / <sub>2</sub>	...
10,175	Acme.	30 1 -1 <sup>1</sup> / <sub>2</sub>	...	Fageol.	6	5700	††Mack.	AC 15	6000	Signal.	M 5	...
9,675	Acme.	40 1 <sup>1</sup> / <sub>2</sub> -2	...	Fageol.	8	...	Mason.	1 <sup>1</sup> / <sub>2</sub>	1295	Signal.	R 7 <sup>1</sup> / <sub>2</sub>	...
10,175	Acme.	60 2 <sup>1</sup> / <sub>2</sub> -3	...	F. W. D.	S 23	...	Master.	11 1 <sup>1</sup> / <sub>2</sub>	...	Service.	61 3	...
10,175	Acme.	90 3 <sup>1</sup> / <sub>2</sub> -4 <sup>1</sup> / <sub>2</sub>	...	Federal.	U2 2 <sup>1</sup> / <sub>2</sub>	...	Master.	21 1 <sup>1</sup> / <sub>2</sub>	...	Service.	81 4	...
10,175	Acme.	125 5 -6 <sup>1</sup> / <sub>2</sub>	...	Federal.	W2 3 <sup>1</sup> / <sub>2</sub> -4	...	Master.	41 2 <sup>1</sup> / <sub>2</sub>	...	Service.	103 6	...
	Amer. La France.	2 <sup>1</sup> / <sub>2</sub>	\$3950	Federal.	X2 5 -6	...	Master.	51 3 <sup>1</sup> / <sub>2</sub>	...	Signal.	NF 1 <sup>1</sup> / <sub>2</sub>	...
	Amer. La France.	3 <sup>1</sup> / <sub>2</sub>	4950	Federal.	TT 1	370	Master.	61 5	...	Signal.	J 3 <sup>1</sup> / <sub>2</sub>	...
	Amer. La France.	5	5500	Federal.	TT 1	490b	Master.	64 5 -6	...	Signal.	M 5	...
\$975	Amer. La France.	21 1 <sup>1</sup> / <sub>2</sub>	2550	Federal.	U23 1 <sup>1</sup> / <sub>2</sub>	...	Maxwell.	1 <sup>1</sup> / <sub>2</sub>	1097	Service.	R 7 <sup>1</sup> / <sub>2</sub>	...
1,195	Armeled.	21 1 <sup>1</sup> / <sub>2</sub>	3150	Federal.	U2 2 <sup>1</sup> / <sub>2</sub>	...	Master.	11 1 <sup>1</sup> / <sub>2</sub>	...	Standard.	75 1 <sup>1</sup> / <sub>2</sub>	\$1330+
995	Armeled.	HWB 2 <sup>1</sup> / <sub>2</sub>	3150	Federal.	W2 3 <sup>1</sup> / <sub>2</sub> -4	...	Master.	21 1 <sup>1</sup> / <sub>2</sub>	...	Standard.	1 <sup>1</sup> / <sub>2</sub> K 1 <sup>1</sup> / <sub>2</sub>	1695
1,395	Armeled.	HWC 2 <sup>1</sup> / <sub>2</sub>	4200	Federal.	X2 5 -6	...	Master.	41 2 <sup>1</sup> / <sub>2</sub>	...	Standard.	2 <sup>1</sup> / <sub>2</sub> K 2 <sup>1</sup> / <sub>2</sub>	2795
845	Armeled.	KWC 3 <sup>1</sup> / <sub>2</sub>	4200	Ford.	TT 1	370	Master.	51 3 <sup>1</sup> / <sub>2</sub>	...	Standard.	3 <sup>1</sup> / <sub>2</sub> K 3 <sup>1</sup> / <sub>2</sub>	3645
	Armeled.	KWC 3 <sup>1</sup> / <sub>2</sub>	4200	Ford.	TT 1	490b	Master.	61 5	...	Standard.	5K 5	4495
1,325	Afterbury.	20R 1 <sup>1</sup> / <sub>2</sub> -2	2475	G. M. C.	K16 1	...	Master.	64 5 -6	...	Star.	3/4	405
1,350	Afterbury.	22C 2 <sup>1</sup> / <sub>2</sub> -3	3375b	G. M. C.	K41 2	...	Maxwell.	1 <sup>1</sup> / <sub>2</sub>	1097	Sterling.	1 <sup>1</sup> / <sub>2</sub>	3240+
1,895	Afterbury.	22D 3 <sup>1</sup> / <sub>2</sub> -4	4275b	G. M. C.	K71 3 <sup>1</sup> / <sub>2</sub>	...	Menominee.	B 1	1650	Sterling.	2	3440+
1,985	Afterbury.	8E 5 -6	4975b	G. M. C.	K101 5	...	Menominee.	HT 1 <sup>1</sup> / <sub>2</sub>	2000	Sterling.	21 <sup>1</sup> / <sub>2</sub>	3700+
1,835	Autocar.	21 1 <sup>1</sup> / <sub>2</sub> -2	2200†	G. M. C.	K101 10	...	Menominee.	H 1 <sup>1</sup> / <sub>2</sub>	2475	Sterling.	31 <sup>1</sup> / <sub>2</sub>	4750+
1,750	Autocar.	26 4 -6	4650†	G. M. C.	K101 15	...	Menominee.	J 5	4850	Sterling.	5	5400+
2,495	Available.	JH 1 <sup>1</sup> / <sub>2</sub>	2450	G. M. C.	K101 15	...	Moline.	10 1 <sup>1</sup> / <sub>2</sub>	1605	Sterling.	EHD 5	6000+
2,685	Available.	H 2 <sup>1</sup> / <sub>2</sub>	3160	G. M. C.	K101 15	...	Nash.	2018 1 -1 <sup>1</sup> / <sub>2</sub>	1595	Sterling.	EHD 7 <sup>1</sup> / <sub>2</sub>	6500+
	Available.	H 3 <sup>1</sup> / <sub>2</sub>	4175	G. M. C.	K101 15	...	Nash.	4017F 2 <sup>1</sup> / <sub>2</sub>	2750†	Sterling.	16 1	1195
	Available.	H 5	5375	G. M. C.	K101 15	...	Nash.	3018 2 -2 <sup>1</sup> / <sub>2</sub>	2150†	Sterling.	15X 1 <sup>1</sup> / <sub>2</sub> -1 <sup>1</sup> / <sub>2</sub>	1595
\$2,765	Bessemer.	G 1	1450	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	9 1 <sup>1</sup> / <sub>2</sub>	1970
2,790	Bessemer.	H2 1 <sup>1</sup> / <sub>2</sub>	1995	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	7K 2 <sup>1</sup> / <sub>2</sub> -3	2690
2,640	Bessemer.	J2 2 <sup>1</sup> / <sub>2</sub>	2895	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	10X 3 <sup>1</sup> / <sub>2</sub> -4	3590
3,115	Bessemer.	K2 4	3495	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	AS 3 <sup>1</sup> / <sub>2</sub> -4	1185
2,765	Bessemer.	KN 1	1595	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	AS 1 <sup>1</sup> / <sub>2</sub>	2400
2,990	Bethlehem.	GN 2	2495	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	B 1 <sup>1</sup> / <sub>2</sub>	2150
3,250	Bethlehem.	HN 3	3295	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	D 2	2490†
	Bethlehem.	HN 3	3295	G. M. C.	K101 15	...	Nash.	5018 2 <sup>1</sup> / <sub>2</sub>	2250	Sterling.	F 3	3150†
1,995	Bridgeport.	A 1 <sup>1</sup> / <sub>2</sub>	...	G. M. C.	K101 15	...	Old Reliable.	B 2 <sup>1</sup> / <sub>2</sub>	3500	Thomart.	20 1 <sup>1</sup> / <sub>2</sub>	1795
2,265	Bridgeport.	B 2 <sup>1</sup> / <sub>2</sub>	...	G. M. C.	K101 15	...	Old Reliable.	C 3 <sup>1</sup> / <sub>2</sub>	4250	Tiffin.	GW 1 <sup>1</sup> / <sub>2</sub> -2	2100+
1,995	Bridgeport.	C 3 <sup>1</sup> / <sub>2</sub>	...	G. M. C.	K101 15	...	Old Reliable.	D 5	5000	Tiffin.	MW 2 <sup>1</sup> / <sub>2</sub> -3	2700+
2,550	Brockway.	E2 1	...	Graham Bros.	1	1265	Old Reliable.	K 7 <sup>1</sup> / <sub>2</sub>	6000	Tiffin.	P35 3 <sup>1</sup> / <sub>2</sub> -4	3600+
2,650	Brockway.	S 1 <sup>1</sup> / <sub>2</sub>	...	Graham Bros.	1 <sup>1</sup> / <sub>2</sub>	1325	Oldsmobile.	T 1	1095	Tiffin.	TW 5 -6	4300†
2,685	Brockway.	K 2 <sup>1</sup> / <sub>2</sub>	...	Gramm-Pion.	10 1	1215	Oneida.	B 1 <sup>1</sup> / <sub>2</sub> -2	2825†	Tiffin.	UW 6 -7	4500†
3,350	Brockway.	R 3 <sup>1</sup> / <sub>2</sub>	...	Gramm-Pion.	15 1 <sup>1</sup> / <sub>2</sub>	1750	Oneida.	C 2 <sup>1</sup> / <sub>2</sub>	3200	Titan.	2 <sup>1</sup> / <sub>2</sub>	2700
3,600	Buck.	T 5	945	Gramm-Pion.	20 2	2250	Oneida.	D 3 <sup>1</sup> / <sub>2</sub>	4050	Titan.	3 <sup>1</sup> / <sub>2</sub>	3600
	Buck.	23-4-SD 3/4	945	Gramm-Pion.	30 3	3200	Overland.	91ce 3/2	395	Titan.	5	4100
	Case.	TR 2	...	Gramm-Pion.	46 4	3850	Patriot.	Revere 1	1350	Traffic.	1 <sup>1</sup> / <sub>2</sub>	1895
	Chevrolet.	Sup'r 1 <sup>1</sup> / <sub>2</sub>	395	Gramm-Pion.	50 5 -6	4450	Patriot.	Lincoln 2	2100	Traffic.	2	1695
	Chevrolet.	Util 1	550	Gray.	1	575	Patriot.	Washington 3	3000	Traffic.	3	2145
\$1,995	Clinton.	20 1 -1 <sup>1</sup> / <sub>2</sub>	1980	Harvey.	WOA 2	2650	Pierce-Arrow.	XA 2	3300	Transport.	15 1	...
1,895	Clinton.	45 1 <sup>1</sup> / <sub>2</sub> -2	2840	Harvey.	WFB 2 <sup>1</sup> / <sub>2</sub>	2950	Pierce-Arrow.	XB 3	3500	Transport.	26 1 <sup>1</sup> / <sub>2</sub>	...
2,495	Clinton.	65 2 <sup>1</sup> / <sub>2</sub> -3	3480	Harvey.	WHB 3 <sup>1</sup> / <sub>2</sub>	3950	Pierce-Arrow.	WC 4	4600	Transport.	35 3	...
	Clinton.	90 3 <sup>1</sup> / <sub>2</sub> -4	4160	††Harvey.	WFT 6	3050	Pierce-Arrow.	WD 5	4700	Transport.	41 3 <sup>1</sup> / <sub>2</sub>	...
	Clinton.	120 5 -7	4890	††Harvey.	WHT 10	4050	Pierce-Arrow.	RE 6	5100	Transport.	75 5	...
	Clydesdale.	10A 1 <sup>1</sup> / <sub>2</sub>	1785	Hendrickson.	O 1 <sup>1</sup> / <sub>2</sub>	2535	Pierce-Arrow.	RF 7 <sup>1</sup> / <sub>2</sub>	5200	Traylor.	B 1 <sup>1</sup> / <sub>2</sub>	2390
	Clydesdale.	.8 2 <sup>1</sup> / <sub>2</sub>	2650	Hendrickson.	R 2 <sup>1</sup> / <sub>2</sub>	3200	Rainier.	R31 2/4	1970	Traylor.	C 2	2850
	Clydesdale.	.6 3 <sup>1</sup> / <sub>2</sub>	3300	Hendrickson.	T 3 <sup>1</sup> / <sub>2</sub>	3725	Rainier.	R29 1	2150	Traylor.	D 3	3300
	Clydesdale.	.4 5	4200	Hendrickson.	K 6	4725	Rainier.	R36 1 <sup>1</sup> / <sub>2</sub>	2590	Triangle.	AA 1	1285
\$1,095	Commerce.	9 3 <sup>1</sup> / <sub>2</sub> -4 <sup>1</sup> / <sub>2</sub>	...	Indiana.	10 1	...	Rainier.	R28 2 -2 <sup>1</sup> / <sub>2</sub>	3000	Triangle.	A 1 <sup>1</sup> / <sub>2</sub> -2	1985
1,565	Commerce.	14 1 <sup>1</sup> / <sub>2</sub>	...	Indiana.	12 1 <sup>1</sup> / <sub>2</sub> -2	...	Rainier.	R20 2 <sup>1</sup> / <sub>2</sub> -3	3550	Triangle.	C 2 -2 <sup>1</sup> / <sub>2</sub>	2285
1,645	Commerce.	25 2 <sup>1</sup> / <sub>2</sub>	...	Indiana.	20 2	...	Rainier.	R25 3 <sup>1</sup> / <sub>2</sub> -5	4400	Triangle.	E 2 <sup>1</sup> / <sub>2</sub> -3	2585†
1,495	Corbit.	S 3 <sup>1</sup> / <sub>2</sub>	1300	Indiana.	25 2 <sup>1</sup> / <sub>2</sub> -3	...	Rainier.	R27 6	5100	Ultimate.	AJ1 2	3250†
1,845	Corbit.	E 1 <sup>1</sup> / <sub>2</sub>	1600	Indiana.	35 3 <sup>1</sup> / <sub>2</sub> -4	...	Reo.	F 1 <sup>1</sup> / <sub>2</sub>	1185	Ultimate.	E 3	3700†
1,895	Corbit.	D 1 <sup>1</sup> / <sub>2</sub>	2150	Indiana.	51 5 -7	...	Reo.	F 2 3/4	1485b	Ultimate.	D 5	5000
2,095	Corbit.	C 2 <sup>1</sup> / <sub>2</sub>	2750	International.	S 1	1250	Republic.	75 1 <sup>1</sup> / <sub>2</sub>	...	United H'way.	15 3/4	...
1,945	Corbit.	B 2 <sup>1</sup> / <sub>2</sub>	3000	International.	21 1	1550†	Republic.	11X 2	...	United.	30 11 <sup>1</sup> / <sub>2</sub>	...
	Corbit.	.B 3 <sup>1</sup> / <sub>2</sub>	3250	International.	31 1 <sup>1</sup> / <sub>2</sub>	1650†	Republic.	19W 3	...	United.	35 2	...
	Corbit.	R 3	3800	International.	41 2	2100†	Republic.	19 3	...	United.	50 2 <sup>1</sup> / <sub>2</sub>	...
\$1,690	Corbit.	A 3 <sup>1</sup> / <sub>2</sub> -4	4500	International.	62 3	2750	Rowe.	CW 1 <sup>1</sup> / <sub>2</sub>	3000	United.	C 3 <sup>1</sup> / <sub>2</sub>	...
	Corbit.	AA 5	4500	International.	101 5	3600	Rowe.	CDW 2	3300	United States.	U 1 <sup>1</sup> / <sub>2</sub>	1875
	Day-Elder.	AN 1 <sup>1</sup> / <sub>2</sub>	...	Kelly-S.	K33 1 <sup>1</sup> / <sub>2</sub>	...	Rowe.	CDW 2 <sup>1</sup> / <sub>2</sub>	3375	United States.	N 1 <sup>1</sup> / <sub>2</sub>	2225
2,290	Day-Elder.	BN 2	...	Kelly-S.	K380 2 <sup>1</sup> / <sub>2</sub>	...	Rowe.	GSW 3	4150	United States.	NW 2	2525
	Day-Elder.	DN 2 <sup>1</sup> / <sub>2</sub>	...	Kelly-S.	K39 2 <sup>1</sup> / <sub>2</sub>	...	Rowe.	HW 4	4500	United States.	P 3	3375
	Day-Elder.	CN 3	...	Kelly-S.	K41 3							

# Current Passenger Car Specifications

*(This list comprises cars distributed on a national basis)*

MAKE AND MODEL	TIRES				ENGINE						Electrical System	Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES		Steering Gear	Rear Spring				
	Wheelbase (Ins.)	Standard Size (Ins.)†	Balloon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings					Type and Make	Type and Make	Foot, Type and Location	Hand, Type and Location	Four Wheel Brake Type	Make				
American.....D-66	127	33x4½	No	H-S	91	6-3½x5	29.40	L	C	3	PS	Str	A-K	P-B&B	War	M-Har	F-Sal	5.10	E-R	I-R	None	Lav	S-57½	
Anderson.....41	115	32x4	Yes*	Cont	7U	6-3½x4½	23.44	L	C	4	PC	Zen	Wes	P-B&B	Dur	R-Goo	5.75	E-R	E-D	Mec*	Gem	S-58		
Anderson.....50	122	32x4	Yes*	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Zen	Rem	P-B&B	Dur	R-Goo	4.50	E-R	E-D	Mec*	Gem	S-58		
Apperson.....6	120	32x4	Yes*	Fall	T8000	6-3½x4½	23.44	I	C	3	PS	Str	Rem	P-Roc	Mec	M-Thi	5.10	E-R	I-R	Mec*	Lav	J-48		
Apperson.....8	130	33x5	No	Own	8	6-3½x4½	33.80	L	C	3	FP	Joh	Bij	D-Own	Own	M-Thi	4.25	E-R	I-R	Mec*	Own	J-48		
Auburn.....6-43	114	31x4	Yes*	Cont	7U	6-3½x4½	23.44	L	C	3	PC	Str	Rem	P-B&B	War	M-Uni	4.63	E-R	E-D	Mec*	Jac	S-57		
Auburn.....6-63	122	32x4½	Yes*	Weid	Spec	6-3½x5	25.35	I	C	3	PC	Str	Rem	P-B&B	War	M-Thi	4.65	E-R	E-D	Mec*	Ros	S-57		
	124																							
Barley.....6-50	118	32x4	No	H-S	40	6-3½x5	25.35	L	C	4	PC	Str	Del	P-B&B	Ful	R-M&E	½ Col	5.10	E-F	I-R	Hyd	Jac	S-56	
Buick.....1924	109	31x4	No	Own	4	4-3½x4½	18.23	I	C	4	PS	Mar	Del	D-Own	Own	M-Own	¾ Col	4.66	E-F	I-R	Mec	Jac	S-55½	
Buick.....1924	120	32x4	No	Own	6	6-3½x4½	27.34	I	C	4	PC	Mar	Del	D-Own	Own	M-Own	½ Col	4.10	E-F	I-R	Mec	Jac	V-46½	
Buick.....1924	128	32x4½	No	Own	6	6-3½x4½	27.34	I	C	4	PC	Mar	Del	D-Own	Own	M-Own	¾ Col	4.70	E-F	I-R	Mec	Jac	V-46½	
Cadillac.....V-63	132	33x5	No	Own	63	8-3½x5½	31.25	L	C	3	PC	Own	Del	D-Own	Own	M-Spi	F-Tim	4.50	B-F	I-R	Mec	Own	N-54	
Case.....X	122	32x4½	No	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Sch	Del	D-Own	Own	R-Sne	½ Col	4.90	E-R	I-R	None	Jac	S-54½	
Case.....Y	132	33x5	No	Cont	6T	6-3½x5½	31.54	L	A	3	PS	Ray	Del	D-Own	Own	R-Sne	¾ Col	4.70	E-R	I-R	None	Jac	S-57	
Chalmers.....6	117	32x4	No	Own	6	6-3½x4½	25.35	L	A	3	PS	Str	A-L	A-L	P-Mee	War	M-Mee	½ Tim	5.13	E-R	I-R	Hyd	Gem	S-56
Chalmers.....6	122	33x4½	No	Own	6	6-3½x4½	25.35	L	A	3	PS	Str	A-L	P-Mee	War	M-Mee	½ Tim	5.13	E-R	I-R	Hyd	Gem	S-56	
Chandler.....Six	123	32x4	No	Own	6	6-3½x5	29.40	I	C	4	PS	Str	Bos	D-Own	O-Fown	F-Own	4.45	E-R	E-D	None	Own	S-		
Chevrolet.....Superior	103	30x3½	No	Own	6	4-3½x4	21.76	I	C	3	PS	[Zen]	Rem	X-Own	Own	M-Own	½ Col	3.77	E-R	I-R	None	Own	Q-23	
Chrysler.....Six	29x4½	31x4	Yes*	Own	6-3	4x4	21.60	L	A	7	FP	Bal	Rem	D-Own	Own	M-Det	½ Col	4.60	E-F	I-R	Hyd	Jax	S-51½	
Cleveland.....42	112½	31x4	Yes*	Own	42	6-3½x4½	22.50	L	A	3	PS	Str	Bos	P-B&B	Own	M-Mee	½ Col	4.90	E-F	E-D	None	CAS	S-53	
Cole.....Master	127½	33x5	Yes*	Nort	311	8-3½x4½	39.20	L	A	3	PC	Joh	Del	D-Nor	Nor	F-Col	4.70	E-R	I-R	None	Gem	S-57		
Columbia.....Light Six	115	31x4	Yes*	Cont	7U	6-3½x4½	23.44	L	C	4	PC	Str	A-L	A-L	P-B&B	Dur	M-Spi	½ Tim	4.80	E-R	E-D	Hyd	Gem	V-7
Crawford.....23-6-70	138	33x4½	No	Cont	6T	6-3½x4½	31.54	L	C	4	PC	Zen	Wes	D-Own	O-Fown	F-Tim	4.23	E-R	I-R	None	Lav	J-62		
Cunningham.....V4	132	33x5	No	Own	V4	8-3½x5	45.00	L	C	3	FP	Str	Del	D-Own	Own	R-Sne	¾ Col	4.23	E-R	I-R	None	None		
Dagmar.....6-70	138	33x5	No	Cont	6T	6-3½x5½	31.54	L	C	4	PC	Zen	Wes	D-B-L	B-L	M-Spi	½ Tim	5.10	E-R	I-R	None	Lav	S-	
Davis.....71	115	31x4	Yes*	Cont	7U	6-3½x4½	23.44	L	C	4	PC	Str	Del	P-B&B	War	M-Pet	½ Tim	5.10	E-R	I-R	Hyd*	CAS	S-52	
Davis.....81	118	31x4	Yes*	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Str	Del	P-B&B	War	M-Pet	½ Tim	5.10	E-R	I-R	Hyd*	CAS	S-52	
Dodge Brothers.....	116	32x6	Yes*	Own	4	4-3½x4½	24.03	L	A	3	Sp	Ste	N.E.	D-Own	Own	N.E.	½ Tim	5.44	E-R	I-R	None	Own	S-55	
Dorris.....6-80	136	32x6	No	Own	6-80	4-4	5	I	C	7	PC	Str	Bos	M-Spi	½ Tim	3.77	E-R	I-R	None	Ros	S-60			
Dort.....27	115	31x4	Yes*	Fall	T8000	6-3½x4½	23.41	I	C	3	PC	Car	Bos	D-Dtl	Own	M-The	¾ Fl	4.66	E-R	I-R	None	Gem	V-50	
Duesenberg Straight....8	134	33x5	No	Own	8	8-2½x5	26.45	I	A	3	PC	Str	Del	P-Own	Own	R-Cli	½ Tim	4.90	I-F	E-D	Hyd	Lav	S-59	
Dupont.....C	124	32x4½	No	H-S	90	6-3½x5	29.40	I	C	3	PS	Str	Wes	D-B-L	B-L	M-Spi	F Col	4.88	E-R	I-R	None	Jac	S-58	
Durant.....A-22	109	31x4	No	Cont	Spec	4-3½x4½	24.03	I	C	3	PC	Til	A-L	P-Own	War	M-Spi	¾ Col	4.33	E-R	I-R	None	War	S-48	
Elcar.....4-40	112	31x4	No	Lyc	CF	4-3½x5	21.03	L	A	5	PC	Zen	Del	P-B&B	War	M-Mec	½ Sal	4.70	E-R	I-R	Mec*	CAS	S-51	
Elcar.....6-50	113	31x4	Yes*	Cont	7U	6-3½x4½	23.44	L	C	4	PC	Str	A-L	P-B&B	War	M-Mec	½ Sal	4.70	E-R	E-D	Mec*	Ros	E-51	
Elcar.....6-60	118	32x4	Yes*	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Str	Del	P-B&B	War	M-Har	¾ Col	4.70	E-R	I-R	Mec*	Gem	S-52	
Elgin.....25	118	32x4½	Yes*	Fall	T8000	6-3½x4½	23.44	I	C	3	PS	Str	DeJ	P-B&B	War	R-Sne	½ Col	4.66	I-F	E-D	Mec*	Ros	O-47	
Essex.....6	110½	31x3½	No	Own	6	6-2½x4	16.54	L	A	3	Sp	Ste	Bos	D-Own	Own	M-Spi	½ Own	5.40	E-R	I-R	None	Own	S-54½	
Flint.....40	115	30x4 4	S.E.	Cont	7U	6-3½x4½	23.44	L	C	3	PC	Ray	Del	P-B&B	War	M-Spi	½ Ad	4.77	E-F	I-R	Mec*	War	S-54	
Flint.....6	120	32x4½	No	Cont	Spec	4-3½x4	27.34	L	C	3	PS	Str	DeJ	P-B&B	War	M-Spi	¾ Col	4.63	E-R	I-R	Mec*	Own	O-43½	
Ford.....T	100	30x3½	No	Own	T	4-3½x4	22.50	L	C	3	Sp	[Own]	Own	M-Spi	¾ Col	6.63	E-D	I-R	None	Own				
Franklin.....10-B	115	32x4½	Yes*	Own	10-B	6-3½x4	25.35	I	A	7	PS	Str	A-K	A-K	P-M&E	Own	M-Spi	F-Own	4.73	E-D	I-D	None	Own	E-38
Gardner.....Series 5	112	32x4	No	Lyc	Spec	4-3½x5	21.76	L	A	5	PC	Zen	Wes	P-B&B	Mec	M-Pet	¾ Fli	4.80	E-R	E-D	None	Dit	E-38	
Gray.....O	104	30x3½	No	Own	0	4-3½x4	21.03	L	C	3	Sp	Sco	Wes	P-B&B	Mec	R-Mec	½ Tim	3.90	I-R	E-D	None	Own	Q-30	
H.C.S.....Series 4	120	32x4½	No	Weid	Spec	4-3½x5½	22.50	I	C	3	PS	Str	Del	D-Own	D-Own	M-Spi	½ Tim	4.63	B-F	I-R	None	None	G-56	
H.C.S.....Series 6	126	32x4½	Yes*	Own	29	40	29.40	L	C	3	FP	Str	Del	D-Own	D-Own	M-Spi	¾ Col	4.36	E-R	I-R	None	None	S-56	
Hatfield.....6-55	121	32x4	No	H-S	40	6-3½x5	25.35	L	C	3	PS	Str	Bos	P-B&B	Dur	M-Spi	½ Tim	4.63	E-R	I-R	None	None	S-58	
Haynes.....60	121	32x4½	No	Own	60	6-3½x4½	29.40	L	C	3	PS	Str	Kin	M-Down	M-Che	M-Thi	½ Own	4.41	E-R	E-D	None	Jac	S-44½	
Hudson.....Super 6	126	32x4½	No	Own	6	6-3½x5	29.40	L	A	4	Sp	Str	Bos	D-Own	Own	M-Spi	½ Tim	4.45	E-R	I-R	None	None	G-58	
Hupmobile.....Series R	115	32x4	No	Own	R	4-3½x5½	16.90	L	A	3	PC	Str	A-K	Wes	D-Lon	Own	M-Uni	½ Own	4.87	E-R	I-R	None	Jac	S-46½
Jewett.....Six	112	31x4	Yes*	Own	6	6-3½x5	25.36	L	C	3	PC	Ray	Rem	D-Own	War	M-Mec	½ Tim	4.54	E-R	I-R	None	Gem	S-54	
Jordan.....NX	120	32x4	Yes*	Cont	Spec	6-3½x4½	26.34	L	C	4	PC	Str	Del	P-Det	War	M-Thi	½ Tim	4.42	E-F	I-R	Hyd	Gem	S-55	
Jordan.....H&L	124½	32x4½	Yes*	Cont	Spec	6-3½x4½	26.34	L	C	4	PC	Str	Del	P-Det	War									



## An Old Company — a New Name

The trade-mark and the product haven't changed  
—only the Company name is different

**I**N the future—Strom Ball Bearings will be manufactured by the Strom Ball Bearing Manufacturing Company. Thus the product, and the company that makes it, will have the same name.

The name "STROM" on a ball bearing is an asset.

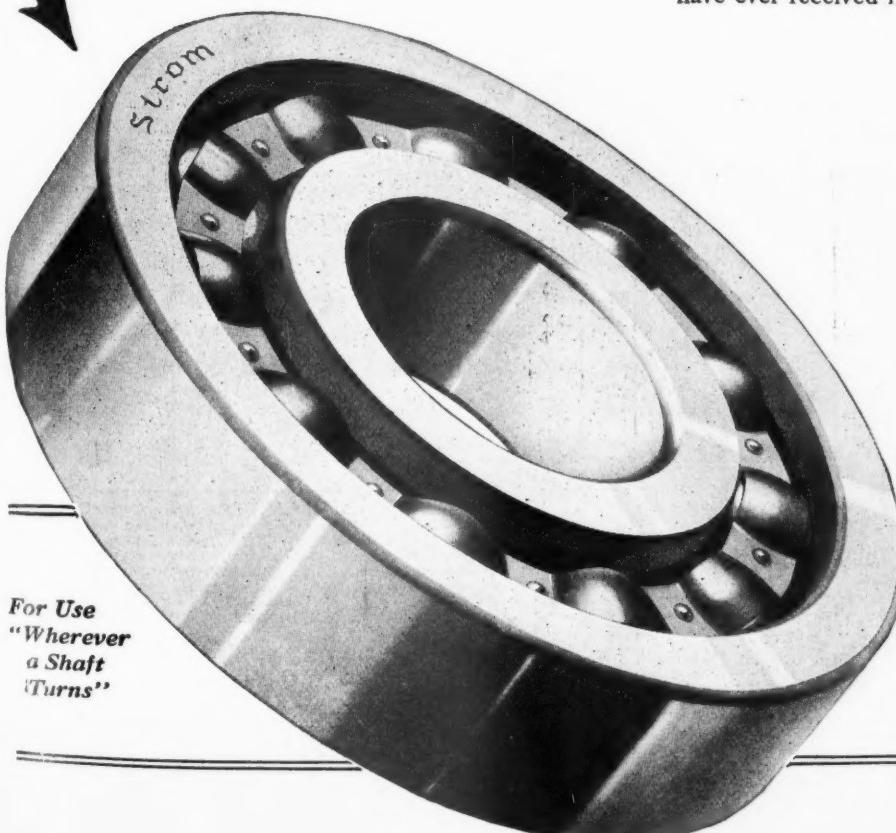
It is the trade-mark of a superior product, made in a superior way.

So we decided to change the name of our corporation to embody this valued trade name.

No changes have been made in the company personnel. The high manufacturing principles which have governed this concern's business will remain the same.

Strom Ball Bearings will still be made with that exact scientific precision and that devotion to perfection for which they have been noted in the past.

Our service will keep on improving, as it has improved in the past. And we ask for our company a continuation of the same kind and generous consideration which we have ever received from the trade.



For Use  
"Wherever  
a Shaft  
Turns"

Our engineers are at your service. Consult them freely.

Our ample stocks are ready to meet any emergency calls. Strom Ball Bearings are made in a wide range of sizes and styles, ready to meet your requirements.

**Strom Ball Bearing Mfg. Co.**

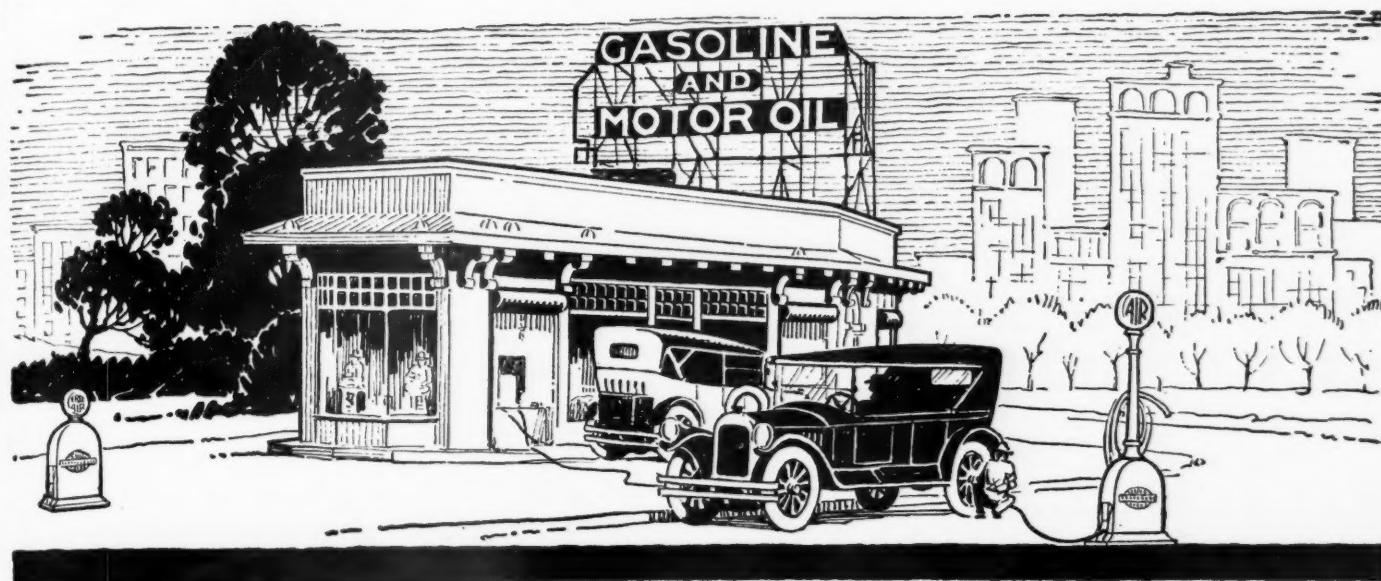
(Formerly U. S. Ball Bearing Mfg. Co.)

4551 Palmer St., Chicago, Ill.

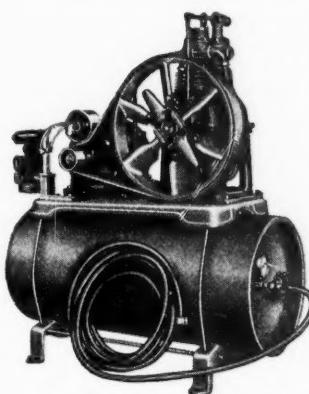
# Current Passenger Car Specifications

*(This list comprises cars distributed on a national basis)*

MAKE AND MODEL	TIRES		ENGINE								Electrical System	Clutch	Gear-set	Universal Joints	REAR AXLE		BRAKES		Steering Gear	Rear Spring				
	Wheelbase (Ins.)	Standard Size (Ins.) <sup>†</sup>	Balloon Equipment	Make	Model	Number of Cylinders, Bore and Stroke (Ins.)	Rated Horsepower, N.A.C.C.	Valve Arrangement	Piston Material	Number of Main Crankshaft Bearings					Type and Make	Make	Type and Make	Foot, Type and Location	Hand, Type and Location	Four Wheel Brake Type				
Packard "Eight".....143	143	33x5	No	Own	8	8-3½x5	36.45	L	C	9	PC	Own	Del	D-Spi	1½ Own	I-F	I-R	Mec	Own	S-54				
Paige.....6-70	131	33x4½	Yes*	Cont	Spec	6-3½x5	33.75	L	C	4	PC	Ray	A-K	D-Lon	1½ Tim	E-R	I-R	None	Gen	S-40				
Peerless.....Six	126	32x4½	No	Own	6	6-3½x5	29.40	L	C	3	PC	Joh	Del	D-Spi	1½ Tim	E-F	I-R	Hyd	Gen	S-54				
Peerless.....66	128	33x5	Yes*	Own	66	8-3½x5	33.80	L	C	7	PC	Bal	Del	D-Spi	¾ Own	E-R	I-R	Hyd*	Gen	S-60				
Pierce-Arrow.....33	138	33x5	No	Own	33	6-4½x5½	38.40	T	C	7	FP	Own	Del	D-Spi	1½ Own	E-R	I-R	Med*	Own	S-*				
Premier.....6-D	126½	32x4½	Yes*	Own		6-3½x5½	27.34	I	A	3	PC	Str	Del	P-B&B	Own	M-Spi	½ Tim	4.58	E-R	I-R	Hyd*	Own	S-57½	
R&V Knight.....H	124	32x4½	No	Own	Kni	6-3½x4½	29.40	X	C	4	PC	Str	A-L	P-B-L	B-L	M-Spi	½ Tim	4.50	E-R	I-R	None	Jac	S-61	
Reo.....T6	120	32x4	Yes*	Own	T6	6-3½x5	24.34	G	A	4	PS	Ray	NE	D-Spi	Own	(R-Own)	½ Own	4.70	E-R	I-R	None	Own	S-54	
Revere.....M	131	32x4	Yes*	Mons	4	4-4½x5	30.63	H	A	2	PS	Str	Bos	D-B-L	B-L	M-Spi	¾ Stn	3.44	E-R	I-R	None	Gen	S-58	
Rickenbacker.....C	117	32x4	Yes*	Own	C	6-3½x4½	23.44	L	C	3	PC	Str	Bos	P-Own	Own	M-Mec	¾ Own	4.60	I-F	I-E	Mec	Gen	S-57	
Roamer.....6-54-E	118	32x4½	No	Cont	12XD	6-3½x5½	29.40	L	A	3	PS	Str	Spl	R-M&E	Ful	M-Spi	¾ Tim	4.60	Mec*	Jac	V-55			
Roamer.....6-54-E	138	32x4½	No	Cont	12XD	6-3½x5½	29.40	L	A	3	PS	Str	Spl	R-M&E	Ful	M-Spi	¾ Tim	4.60	Mec*	Jac	V-55			
Roamer.....4-75-E	128	32x4½	No	Dues	G1	4-4½x5	28.90	H	A	3	FP	Til	Bos	D-B-L	B-L	R-M&E	¾ Sal	4.63	E-R	I-R	Mec*	Jac	V-55	
Rollin.....112	31x5½	S.E.	Own		4-3½x4½	16.90	L	A	4	PC	Til	Con	P-B&B	Mun	R-Sne	½ Sal	5.10	E-F	I-R	Mec	Dit	S-46		
Rolls-Royce.....40-50	143½	33x5	Own	40	6-4½x4½	48.60	L	A	7	FP	Own	Bos	M-Own	F Own	M-Spi	¾ Own	3.72	I-R	I-R	None	Own	V-54		
Sayers Six.....GL	136	33x5	No	Cont	6J	6-3½x5	33.75	L	C	5	PC	Str	Del	P-B&B	B-L	M-Cli	F Tim	4.91	E-R	I-R	None	Ros	S-56	
Seneca.....50&51c	131	31x4	Yes*	Own	CF	4-3½x5	21.03	L	A	5	PC	Str	Zen	M-Uni	F Pen	4.50	E-R	I-R	None	Dit	S-52			
Stanley.....740	130	32x4½	No	Own	740	2-4	x5	13.00				Non	Non	Non	Non	Non	½ Own	4.50	E-R	I-R	None	War	S-49	
Star.....4	102	30x3½	No	Cont	Spec	4-3½x4½	15.63	L	C	3	PS	Til	A-L	P-Own	War	M-Spi	¾ Ad	4.87	E-R	I-R	Mec*	Own	V-50	
Stearns-Knight.....SKL4	119	33x5½	No	Own	Kni	4-3½x5½	22.50	X	C	4	PC	Sch	A-K	D-Own	R-Ch	½ Own	4.50	E-R	I-R	Hyd*	Own	V-50		
Stearns-Knight.....6	130	33x5	No	Own	Kni	6-3½x5	25.35	X	C	4	PC	Sch	A-K	D-Own	R-Ch	½ Own	4.70	E-R	I-R	Hyd*	Own	S-56		
Stephens.....104&20	117	32x4	No	Own	20	6-3½x4½	25.35	I	C	3	FP	Str	Del	P-B&B	M-Mec	½ Tim	5.10	E-R	E-D	Hyd*	Gen	S-57		
Stephens.....124	124	33x4	No	Own														5.30						
Sterling-Knight.....125	32x4½	No	Own	Kni	6-3½x4½	25.35	S	C	7	FP	Str	Wes	D-Ful	R-Cli	½ Tim	4.56	E-R	I-R	None	Ros	S-58			
Studebaker.....Light Six	112	31x4	No	Own	LS	6-3½x4½	23.44	L	C	4	PS	Str	Wag	P-Own	Ful	R-The	½ Own	5.00	E-R	I-R	None	Own	S-50	
Studebaker.....Spec. Six	119	32x4	No	Own	SS	6-3½x5	29.40	L	C	4	PS	Str	Wag	P-Own	Own	M-Spi	½ Own	4.33	E-R	I-R	None	Own	S-56	
Studebaker.....Big Six	126	33x4½	No	Own	BS	6-3½x5	36.04	L	C	4	PS	Bal	Wag	P-Own	Own	M-Spi	½ Own	3.71	E-R	I-R	None	Own	S-56	
Stutz.....690	120	32x4½	No	Weid	Spec	6-3½x5	27.34	I	B	3	FP	Str	Rem	P-B&B	War	M-Mec	½ Tim	4.66	E-R	I-R	None	Gen	S-62	
Stutz.....KLDH	130	32x4½	Yes*	Own	KLDH	4-4½x6	30.63	T	C	3	PC	Str	Del	D-War	War	M-Har	¾ Own	3.75	I-R	I-R	None	Gen	S-60	
Stutz.....695	130	32x4½	Yes*	Own	695	6-3½x5	29.40	I	C	3	PC	Str	Rem	P-B&B	War	M-Uni	½ Tim	4.66	E-R	I-R	Hyd*	Gen	S-61½	
Templar.....122	33x4	No	Own			6-3½x5	27.34	L	C	PS	Til	Con	R-Cli	P-M&E	War	M-Thi	½ Own	4.00	E-R	I-R	Hyd*	Gen	S-55	
Velie.....56&58	118	32x4	Yes*	Own	56	6-3½x4½	24.38	I	C	4	FP	Str	A-K	Wes	P-Goo	Dur	M-Thi	½ Own	4.00	E-R	I-R	Hyd*	Gen	S-55
Westcott.....48	125	32x4½	Yes*	Cont	12X	6-3½x5½	29.40	L	A	PS	Ray	Del	P-B&B	B-L	M-Pet	½ Tim	4.45	E-R	I-R	Mec*	Gen	S-59		
Westcott.....44	120	32x4½	Yes*	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Ray	Del	P-B&B	War	M-Pet	½ Col	4.90	E-R	I-E	Mec*	Gen	S-57½	
Westcott.....6	127	32x4½	Yes*	Own	60	6-3½x5	25.35	L	C	7	PC	Ray	Del	P-M&E	War	M-Pet	½ Col	4.45	E-F	I-R	Hyd	Lav	S-54½	
Wills Ste. Claire.....A&B68	121	32x6	SE	Own	68	8-3½x4	33.80	I	C	3	FP	Hol	Del	D-Own	M-Mec	½ Own	4.45	E-F	I-R	Hyd	Lav	S-54½		
Willys Knight.....64&67	118	32x4	No	Own	64	4-3½x4½	21.03	X	C	3	PS	Til	A-L	D-Own	R-Own	¾ Own	4.44	E-R	I-R	None	Own	S-55		
Willys Knight.....124	124	32x4	No	Own													5.12							
<b>TAXICABS</b>																								
Checker.....117	32x4½	No	Buda	WTU	4-3½x5½	22.50	L	C	3	PC	Zen	Bos	Wes	D-Ful	Ful	Blo	¾-Col	4.87	E-R	I-R	None	Jon	S-57½	
Dodge.....116	32x4	Yes*	Own	WTU	4-3½x4½	24.03	L	A	3	SP	Ste	N-E	N-E	D-Own	Ful	M-Own	½ Own	4.54	E-R	I-R	None	Own	S-55	
Driggs.....108½	30x3½	No	Own	WTU	4-2½x4½	11.03	L	C		PS	Zen	N-E	Bos	D-Ful	¾ Own	4.75	E-R	I-R	None	Own	S-			
Elcar.....4	118	33x4½	No	Lyc	CF	4-3½x5	21.03	L	A	5	PC	Car	Del	P-B&B	Mun	Pot	¾ Sal	4.75	E-R	I-R	None	CAS	S-51	
Elcar.....6	118	33x4½	No	Cont	8R	6-3½x4½	27.34	L	C	4	PC	Str	Del	P-B&B	War	Spi	¾ Sal	4.75	E-R	I-R	None	Gen	S-52	
Kelsey.....E	112	32x4	No	Lyc	CH	4-3½x5	19.60	L	A	5	PC	Zen	Bos	P-B&B	Wil	M-Spi	¾ Sal	5.10	E-R	I-R	None	Lav	S-55	
Pennant.....115	33x4½	No	Buda	WTU	4-3½x5½	22.50	L	B	3	PC	Zen	Bos	Wes	D-Ful	Ful	Blo	¾ Col	4.87	E-R	I-R	None	Jon	S-57	
Pennant.....4A	115	33x4½	No	Buda	WTU	4-3½x5½	22.50	L	B	3	PC	Zen	Bos	D-Ful	Ful	Blo	¾ Col	4.70	E-R	I-R	None	Own	S-57½	
Rauch & Lang.....T	112	32x4	No	Buda	WTU	4-3½x5½	22.50	L	B	3	PC	Zen	Bos	Dyn†	P-Det	Spi	½ Sta	5.10	E-R	E-D	None	Gen	S-59½	
Rauch & Lang <sup>ss</sup> .....102	102	33x4½	No	Own		Electric		L	B	3	PC	Non	Own	D-None	Spi	½ Sta	8.60	E-R	E-D	None	Gen	S-		
Reo.....V	113	33x4½	Yes*	Own		6-3½x5	24.30	G	A	PS	Ray	N-E	N-E	D-Own	Own	½ Own	4.70	E-R	I-R	None	Own	S-55		
Traveler.....108½	32x4	No	Buda	WTU	4-3½x5½	22.50	L	B	3	PC	Eis	Eis	B-L	Wil	Spi	Col	E-R	I-R	None	Gen	S-			
White.....15A	119	34x4½	No	Own		4-3½x5½	22.50	L	C	3	Sp	Zen	N-E	D-Own	Own	½ Own	5.12	E-R	I-R	None	Own	S-		
White.....118	118	32x4½	No	Own		4-2½x4½	21.03	X	C	3	PS	Til	A-L	D-Own	Own	½ Own	5.12	E-R	I-R	None	Own	S-		
Yellow.....O4	109	32x4½	No	Cont	V7	4-3½x5	18.23	L	C	3	PC	Zen	Bos	N-E†	D-B-L	B-L	Spi	½ Tim	4.90	E-R	E-D	None	Gen	56
Yellow.....A2	109	29x4½	SE	Cont	V7	4-3½x5	18.23																	



## No Spitting of Oil When a Curtis Cuts Out



There are two sound reasons for this. First: The exclusive and patented controlled splash oiling system prevents an excess of oil from getting into the discharge line. Second: There is no bleeding discharge pipe or intermediate tank. Automatic starting and stopping device includes centrifugal unloader to relieve compressor of starting load.

## Many Styles and Sizes

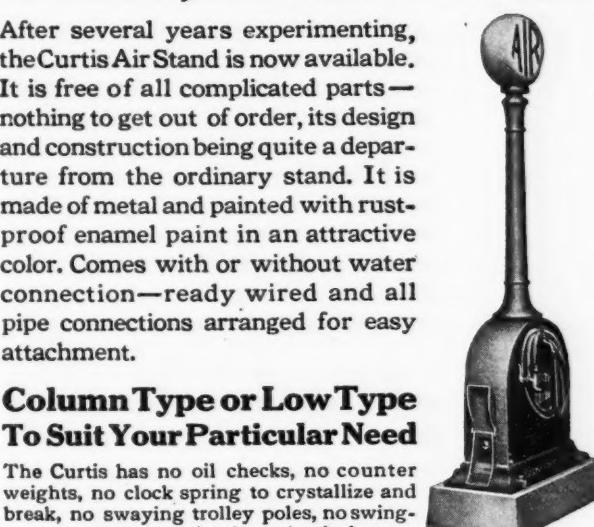
We manufacture in our 17½ acre plant a complete line of single and two-stage air and water-cooled compressors, stationary and portable. They are original in design—embody many exclusive features that assure long life and minimum upkeep. There is a style, size and arrangement to suit your particular needs. Use coupon for full information.

## At Last, a Real Air Stand

After several years experimenting, the Curtis Air Stand is now available. It is free of all complicated parts—nothing to get out of order, its design and construction being quite a departure from the ordinary stand. It is made of metal and painted with rust-proof enamel paint in an attractive color. Comes with or without water connection—ready wired and all pipe connections arranged for easy attachment.

### Column Type or Low Type To Suit Your Particular Need

The Curtis has no oil checks, no counter weights, no clock spring to crystallize and break, no swaying trolley poles, no swinging hose that is dangerous to persons standing nearby, or to glass windshields. Has hose outlet 4½" above curb line so there is no dragging of hose over fenders or hood. Hose is automatically stored on a drum. The tension to wind the drum is provided with a large, generously proportioned cylinder spring and will last a life time. Has positive stop to prevent hose being drawn out or wound in too far. When not being used the hose automatically winds itself up into the housing, thereby not being exposed to the elements.



**CURTIS PNEUMATIC MACHINERY CO.**  
1527 Kienlen Ave., St. Louis, U. S. A.

Branch Office  
530-H Hudson Terminal, New York City

# CURTIS

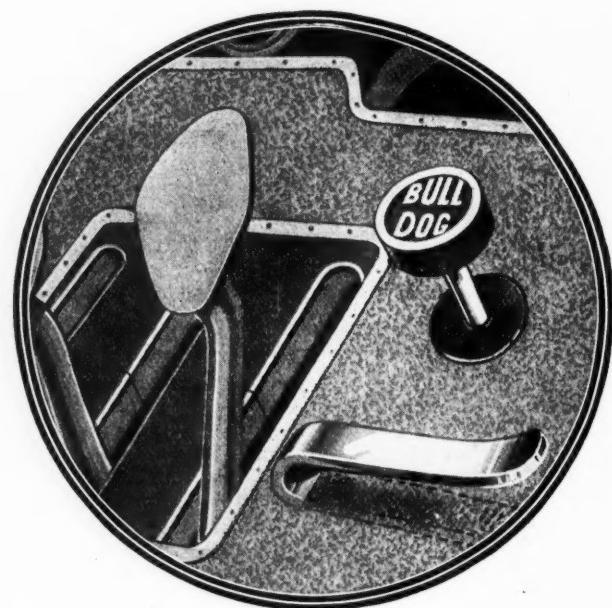
1854 **70<sup>th</sup>** ANNIVERSARY 1924

**CURTIS**  
PNEUMATIC  
MACHINERY CO.  
1527 Kienlen Ave.  
ST. LOUIS, MO.

Gentlemen: — Please send me  
full details on  
 Curtis Compressors  
 Curtis Air Stands

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Jobber's Name \_\_\_\_\_  
Address \_\_\_\_\_

THE BEST ACCELERATOR FOR FORDS



# Accepted

by nine out of ten owners and  
new buyers of Fords as the  
best Foot Accelerator made.

YOUR easiest profits are made on products with a known record of quality and reliability. The Bull Dog record is well known. It is accepted by Ford Owners as the "Best Accelerator for Fords." It represents true value at \$1.50, and even at this reasonable price there is a generous profit for the dealer. Sold by leading jobbers everywhere.



THE W. H. THOMAS MANUFACTURING CO., SPENCER, IOWA



## All aboard for prosperity —

**M**otorists everywhere demanding Balloon tires for their present cars, and you selling them Michelin Comfort Cords—by far the biggest balloon tires for present rims and the only line of balloon tires that includes a balloon that fits Ford Clincher rims without change.... doesn't that sound prosperous?

Perhaps the tire business in your town has not been exactly

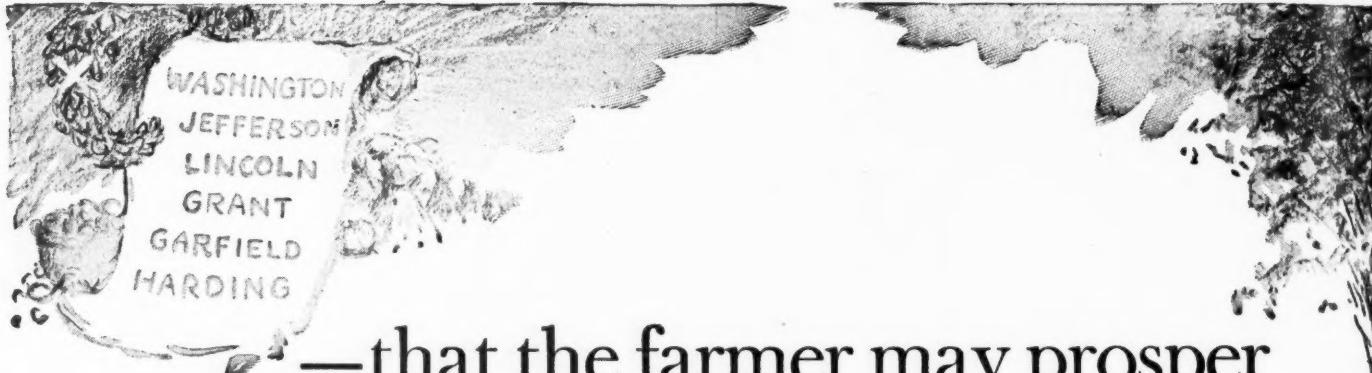
perfect. Perhaps here and there some fellow has offered a little ungentlemanly competition and indulges in a bit of so-called "gyping."

But here's an end to all such troubles! Get aboard the Michelin Comfort Cord Balloon and sail to a land where the gyp is outlawed, where sales come easy and the net profits are as big as the tires. Wire us to have a representative call.

Michelin Tire Company, Milltown, New Jersey

### Fit present cars

without any change in wheels or  
rims even in the Ford Clincher size



## —that the farmer may prosper and the nation progress

These are the words of three farmers:

**1** "My wife was a city girl. She is a talented musician and holds a position in a church quartet. Though our home is on the farm she goes to town whenever she chooses and has kept up all her church activities and other interests. How does she do this? Simply by means of the car.

"Her city friends told her she would have a lonesome life in the country, but they tell her now she is far better off than they are. She has Nature all around her, and can still enjoy the city."

**2** "It is a day's work for a team of horses to go to the village and back. With my car I make the round trip in less than three hours. If we could not have our car any more, *it would be like having no sunshine in our lives.*"

**3** "Our automobile and our electric power plant have revolutionized our lives in the past few years. With our car we can get to town oftener and in less time; and the power plant has given us the convenience of electric light and many labor-saving devices."

Every President of the United States, with two exceptions, was born in a village or on a farm. Sons of farmers have exercised leadership in every phase of our national life. And this will always be the case, for men who work alone have time to think, and their thinking is *their own.*

Hence the contribution of the automotive industry to the farmer is perhaps the most important of all its contributions; for unless he prospers, the nation cannot progress. His are crops of the spirit as well as of the soil: not only food but leadership; not only produce but men.



### PRODUCTS OF GENERAL MOTORS

BUICK  
CADILLAC  
CHEVROLET  
OAKLAND  
OLDSMOBILE  
GMC TRUCKS

Delco and Remy Electrical Equipment • Fisher Bodies • Harrison Radiators • Jacov Steering Gears AC Spark Plugs—AC Speedometers • New Departure Ball Bearings Delco-Light Electric Plants Frigidaire Electric Refrigerators Jaxon Rims • Brown-Lipe-Chapin Differential Gears • Lancaster Steel Products • Hyatt Roller Bearings Klaxon Horns.

General Motors cars, trucks and Delco-Light products may be purchased on the GMAC Payment Plan. Insurance service is furnished by General Exchange Corporation.

# GENERAL

7, 1924

April 17, 1924

MOTOR AGE

63



**MOTORS**

SELL THE ONLY OIL RING WITH A MILEAGE GUARANTEE

**"Good merchandise is *half* sold  
as soon as you buy it..."**  
*Another point in favor of*



Guaranteed  
1000 miles  
to the  
Gallon of Oil

The average motorist knows nothing about the real merits of the various makes of piston rings—but when you show a Sav-Oil oil ring and tell him that it carries a guarantee of at least 1000 miles to every gallon of oil, he is going to have a wholesome respect for it. Sales resistance is eliminated.

Test this demonstration with Sav-Oil rings on your customers—you'll be quickly convinced. Our nearest distributor has a complete assortment of all sizes on hand for immediate delivery. Send for a trial order.

*Territories Open for Distributors*

**The Sav-Oil Ring Mfg. Co.**

1037 So. Figueroa St.

Los Angeles

Sav-Oil Piston Ring Co. 2056 Jackson Blvd. Chicago, Illinois
Sav-Oil Ring Mfg. Co. 550 Golden Gate Ave. San Francisco, Cal.
H. C. Alexandria 612 W. Seventh St. Little Rock, Ark.
H. W. Blevins 1532 Grand Ave. Kansas City, Mo.
C. H. Mountjoy & Co. 211 Third Street San Antonio, Texas

1 out of 8  
cars

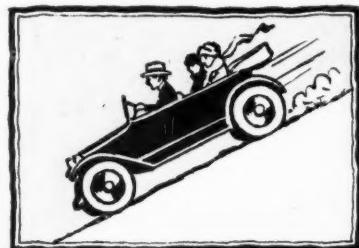
ought to be off  
the road to-day  
having their  
brakes relined

Last year the New York Police brake inspection squad arrested one motorist out of every eight examined for defective brakes.

Considering the number of cars in the country as a whole, this means that there are well over a million cars on the road to-day with defective brakes. The next few pages tell you several ways to get these delinquent prospects into your shop—on business.

# Profitable brake lining pretty fast ~ but you

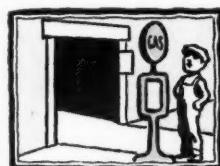
here's  
one way:-



This is a motorist with family and poor brakes out for a Saturday afternoon thrill.



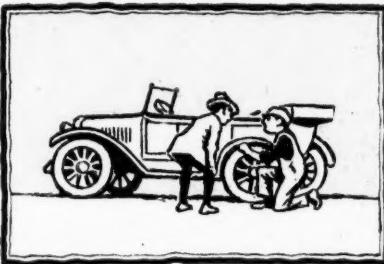
This is the crossing where he over-runs dummy cop and almost runs over real one.



This is your garage where he pauses for gas.



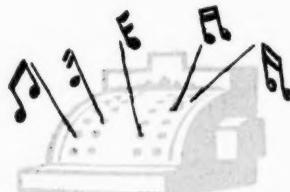
The bright colors of this sign, which you got free from Johns-Manville, catch his eye, and remind him of his brakes.



You inspect his brakes and tell him you can re-line in a short time.



You tell him you use Johns-Manville Asbestos Brake Lining.



All of which results in merry music from the keys of this instrument.

here's another way ~



It's one a. m. and all's well in your garage.

# JOHNS-MAN

There's more  
business here



Johns-Manville  
Asbestos  
Brake Lining  
for Ford Cars

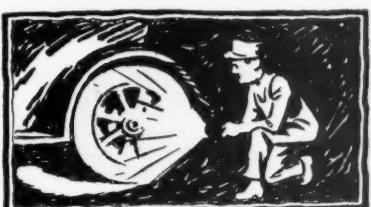


Johns-Manville  
Automobile Tape

# Business drives by but you can stop it!



The night man, who is reading this magazine, gets an idea.



He inspects the brakes of all the storage cars in the garage and finds a lot of business.



This is but one of several car owners who finds this note at the wheel in the morning.



"Sure, we use Johns-Manville Lining", you tell him.

here's another way



It's the first of the month and you're sending out your bills.



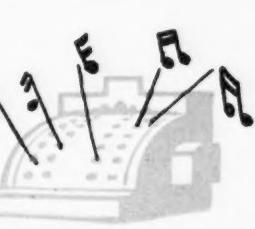
You wish they were larger.



So you enclose some of the brake inspection return post-cards, your distributor gave you.



Same happy ending.



Same happy ending.



# N VILLE

## AUTOMOTIVE EQUIPMENT



Johns-Manville  
Automotive Seigelite  
Sheet Packing



Johns-Manville  
Automotive Jewett  
Ring Packing



Johns-Manville  
Asbestos  
Clutch Facing



Johns-Manville  
Automotive  
Service Sheet Packing

# CHOOSE YOUR DISTRIBUTOR

## Alabama

Moore-Handley Hardware Co., Birmingham  
 Johnson Tire & Auto Co., Montgomery  
**Arkansas**  
 Fort Smith Automotive Supply Co., Fort Smith  
 Crow-Burlingame Co., Little Rock  
**California**  
 Chanslor & Lyon Co., Fresno  
 The Banta Company, Los Angeles  
 Chanslor & Lyon Co., Los Angeles  
 Featherstone, E. A., Los Angeles  
 McCoy Moto Supply Co., Los Angeles  
 Chanslor & Lyon Co., Oakland  
 Weinstock-Nichols Co., Oakland  
 Kimball-Upon Co., Sacramento  
 P. W. Gavin Company, San Diego  
 Chanslor & Lyon Co., San Francisco  
 McCoy Moto Supply Co., San Francisco  
 Weinstock-Nichols Co., San Francisco  
 California Auto Supply Co., Stockton  
**Colorado**  
 Auto Equipment Co., Denver  
 Foster Auto Supply Co., Denver  
 Motor Accessories & Tire Co., Pueblo  
**Connecticut**  
 Hessel & Hoppen Co., New Haven  
 Motor Tire Service Co., Putnam  
**District of Columbia**  
 National Electrical Supply Co.  
 Rubel, Chas., & Co.  
**Florida**  
 Baughman Company, G. Norman, Jacksonville  
 Baughman Company, G. Norman, Miami  
 Baughman Company, G. Norman, Tampa  
**Georgia**  
 Alexander-Seewald Co., Atlanta  
 Ozburn-Abston & Co., Atlanta  
 The Frank Corporation, Savannah  
**Illinois**  
 Automobile Supply Co., Chicago  
 Chicago Automobile Supply House, Chicago  
 Motor Car Supply Co., Chicago  
 Sheridan Auto Supply Co., Chicago  
 Tenk Hardware Co., Quincy  
 Washington Auto Supply Co., Washington  
**Indiana**  
 Orr Iron Co., Evansville  
 Lomont & Co., Fort Wayne  
 The L. J. Cooper Rubber Co., Indianapolis  
 Goodlin Auto Equip. Co., South Bend  
**Iowa**  
 Cedar Rapids Auto Supply Co., Cedar Rapids  
 Sieg Co., Davenport  
 Herring Motor Co., Des Moines  
 Repass Auto Co., Waterloo  
**Kansas**  
 The Weston Motor Supply Co., Salina  
 Southwick Auto Supply Co., Topeka  
 The Masey Hardware Company, Wichita  
**Kentucky**  
 Peaslee-Gaibert Co., Louisville  
**Louisiana**  
 Shuler Auto Supply Co., New Orleans  
 Interstate Electric Co., Shreveport  
**Maine**  
 The Farrar-Brown Co., Inc., Portland  
**Maryland**  
 Auto Supply Co., Baltimore  
 Coggins & Owens, Baltimore  
**Massachusetts**  
 Linscott Supply Co., Boston  
 Motor Tire Service Co., Fitchburg  
 Duncan & Goodell Co., Worcester  
 Motor Tire Service Co., Worcester  
**Michigan**  
 E. A. Bowman, Inc., Detroit  
 Tisch Auto Supply Co., Grand Rapids  
**Minnesota**  
 Kelley-Duluth Co., Duluth  
 Minneapolis Iron Store Co., Minneapolis  
 Reinhard Bros. Co., Minneapolis  
 Williams Hardware Co., Minneapolis  
 Nicols, Dean & Gregg, St. Paul  
**Missouri**  
 Joplin Supply Co., Joplin  
 The Faeth Company, Kansas City

## Missouri (cont'd)

Ayers Auto Supply Co., St. Joseph  
 Beck & Corbitt Iron Co., St. Louis  
 Fred Campbell Auto Supply Co., St. Louis  
 Geller, Ward & Hasner, St. Louis  
 Ozark Motor & Supply Co., Springfield  
**Montana**  
 Northwestern Auto Supply Co., Billings  
**Nebraska**  
 Nebraska Buick Auto Co., Lincoln  
 Storz-Western Auto Supply Co., Omaha  
**Nevada**  
 Nevada Auto Supply Co., Reno  
**New Hampshire**  
 Thompson & Hoague Company, Concord  
**New Jersey**  
 Economy Auto Supply Co., Newark  
 Pruden Hardware Co., Newark  
**New York**  
 Albany Hardware & Iron Co., Albany  
 Martin-Evans Co., Brooklyn  
 H. D. Taylor Co., Buffalo  
 Barker, Rose & Clinton Co., Elmira  
 Weaver-Ebbing Automobile Co., N. Y. C.  
 Pruden Hardware Co., W. E., N. Y. C.  
 Whittemore-Slim Co., Inc., N. Y. C.  
 The Olmsted Co., Inc., Syracuse  
**North Carolina**  
 Carolina Auto Supply House, Charlotte  
 Glasgow-Stewart & Company, Charlotte  
 Automobile Supply Co., Wilmington  
**North Dakota**  
 Grant-Dadey Company, Fargo  
**Ohio**  
 The Penn, Rubber & Supply Co., Akron  
 C. & D. Auto Supply Co., Cincinnati  
 The I. J. Cooper Rubber Co., Cincinnati  
 The Penn, Rubber & Supply Co., Cincinnati  
 The Penn, Rubber & Supply Co., Cleveland  
 The I. J. Cooper Rubber Co., Columbus  
 The Penn, Rubber & Supply Co., Columbus  
 The I. J. Cooper Rubber Co., Dayton  
 The Penn, Rubber & Supply Co., Toledo  
 The Penn, Rubber & Supply Co., Youngstown  
**Oklahoma**  
 Sevier-Tire & Supply Co., Oklahoma City  
 Sevier & Company, Tulsa  
 Machinery & Supply Co., Tulsa  
**Oregon**  
 Wiggins Company, Inc., Portland  
 Chanslor & Lyon Co., Portland  
**Pennsylvania**  
 Motor Accessories Co., Allentown  
 Central Supply Co., Altoona  
 The Penn, Rubber & Supply Co., Erie  
 Front Market Motor Supply Co., Harrisburg  
 General Auto Supply Co., Harrisburg  
 Johnstown Auto Co., Johnstown  
 General Auto Supply Co., Lancaster  
 The Penn, Rubber & Supply Co., Oil City  
 Berrodin Auto Supply Co., Philadelphia  
 Gaul, Deppen & Co., Philadelphia  
 Robert Electric Supply Co., H. C., Phila.  
 Dyke Motor Supply Co., Pittsburgh  
 Jackson Motor Supply Co., Pittsburgh  
 American Auto Supply Co., Inc., Scranton  
 General Auto Supply Co., York

## Oklahoma

Sevier-Tire & Supply Co., Oklahoma City  
 Sevier & Company, Tulsa  
 Machinery & Supply Co., Tulsa

## Oregon

Wiggins Company, Inc., Portland  
 Chanslor & Lyon Co., Portland

## Pennsylvania

Motor Accessories Co., Allentown  
 Central Supply Co., Altoona  
 The Penn, Rubber & Supply Co., Erie  
 Front Market Motor Supply Co., Harrisburg  
 General Auto Supply Co., Harrisburg  
 Johnstown Auto Co., Johnstown  
 General Auto Supply Co., Lancaster  
 The Penn, Rubber & Supply Co., Oil City  
 Berrodin Auto Supply Co., Philadelphia  
 Gaul, Deppen & Co., Philadelphia  
 Robert Electric Supply Co., H. C., Phila.  
 Dyke Motor Supply Co., Pittsburgh  
 Jackson Motor Supply Co., Pittsburgh  
 American Auto Supply Co., Inc., Scranton  
 General Auto Supply Co., York

## Rhode Island

Belcher & Loomis Hardware Co., Providence

## South Carolina

Franke Co., Inc., C. D., Charleston  
 D. W. Alderman, Jr., Inc., Florence  
 D. W. Alderman, Jr., Inc., Greenville

## South Dakota

L. & L. Motor Supply Co., Sioux Falls

## Tennessee

Southern Auto Supply Co., Chattanooga  
 The I. J. Cooper Rubber Co., Knoxville  
 Ozburn-Abston & Co., Memphis  
 Auto Supply Co., Nashville  
 The I. J. Cooper Rubber Co., Nashville

## Texas

Ferris-Dunlap Co., Dallas  
 Tri-State Motor Company, Inc., El Paso  
 The Equipment Co. of Texas, Fort Worth  
 Meyer Co., Jos. F., Houston

## Texas (cont'd)

The Southern Equipment Co., San Antonio  
 McCauley-Ward Motor Supply Co., Waco

## Utah

Inter-Mountain Electric Co., Salt Lake City  
 Motor Mercantile Co., Salt Lake City

## Vermont

Vermont Hardware Co., Burlington

## Virginia

The Owens-Merritt Co., Danville  
 Piedmont Hardware Co., Danville  
 Crump Co., Benj. T., Richmond  
 Meadows-Price Co., Roanoke

## Washington

Chanslor & Lyon Co., Seattle  
 Reynolds & Reynolds, Seattle  
 Chanslor & Lyon Co., Spokane  
 Holley-Mason Hardware Co., Spokane  
 Chanslor & Lyon Co., Tacoma  
 Reynolds & Reynolds, Tacoma

## West Virginia

Williams Hardware Co., Clarksburg

## Wisconsin

Clemens Auto Supply Co., Eau Claire  
 Andre & Sons Co., Julius, Milwaukee  
 Shadolt & Boyd Iron Co., Milwaukee  
 Tisch Auto Supply Co., Milwaukee  
 Western Motor Supply Co., Milwaukee

## Wyoming

Auto Equipment Co., Casper

## CANADA

**Alberta**  
 The Motor Car Supply Co., of Canada, Ltd., Calgary  
 The Motor Car Supply Co., of Canada, Ltd., Edmonton

## British Columbia

Marshall-Wells, B.C., Ltd., Vancouver

## Manitoba

Wood, Vallance, Ltd., Winnipeg

## Ontario

A. Chown & Co., Ltd., Kingston  
 A. Workman & Co., Ltd., Ottawa  
 Hyslop Brothers Ltd., Toronto  
 Johnston-Deane Ltd., Toronto  
 Samuel Trees & Co., Ltd., Toronto  
 Bowman-Anthony Co., Windsor

## Saskatchewan

Wood, Vallance, Limited, Regina

## FOREIGN

**Australia**  
 Duncan & Co., Melbourne  
 Cornell, Ltd., Adelaide  
 Canada Cycle & Motor Agency, Brisbane  
 Hislop, Lloyd & Co., Sydney

## Great Britain and Ireland

A. C. R. Greene & Co., Ltd., London

## Japan and Korea

Takemura Company, Yokohama

## Jugo-Slavia

William H. Smyth, Belgrade

## Mexico

Mexico Auto Supply Co., Mexico City

## New Zealand

Jas. J. Niven & Co., Ltd., Wellington

## Norway, Sweden and Denmark

F. Bulow & Co., Copenhagen

## Panama

The Torbert Wholesale Rubber & Accessory Co., Panama City

## Spain

Luis R. Villamil, Madrid

## Sweden

A. B. Stern & Stern, Stockholm

## Union of South Africa

Bartle & Co., Ltd., Johannesburg

## Uruguay

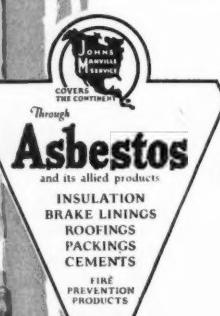
Clericetti & Barrella, Montevideo

JOHNS-MANVILLE Inc., 294 Madison Ave., at 41st St., New York City

Branches in 61 Large Cities

For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto

**JOHNS-MANVILLE**  
 Automotive Equipment



# With springs anchored in live resilient rubber!

The Sterling-Knight is Shock Insulated. This is a feature which means as much to the spring suspension as Knight sleeves mean to the engine. Rubber Shock Insulators, sponsored by America's pioneer Knight engine designer, introduce comfortable and trouble-free riding qualities in the Sterling-Knight Six.

Sterling - Knight springs are tightly gripped at each end in blocks of live, resilient rubber which are held under pressure. This permits freedom in flexing. It eliminates noise and wear at the spring ends, and the constant need of adjustment. This mass of rubber absorbs minor vibration — the cause of crystallization.

Furthermore, the use of rubber insulators in place of shackles and bolts makes lubricating unnecessary and at the same

time greatly strengthens the assembly. The shock insulators never wear out.

A great car to ride in — the Sterling-Knight is also a car of remarkable performance—for don't forget that it is powered by Pete Sterling's wonderful "Knight-type" six cylinder engine.

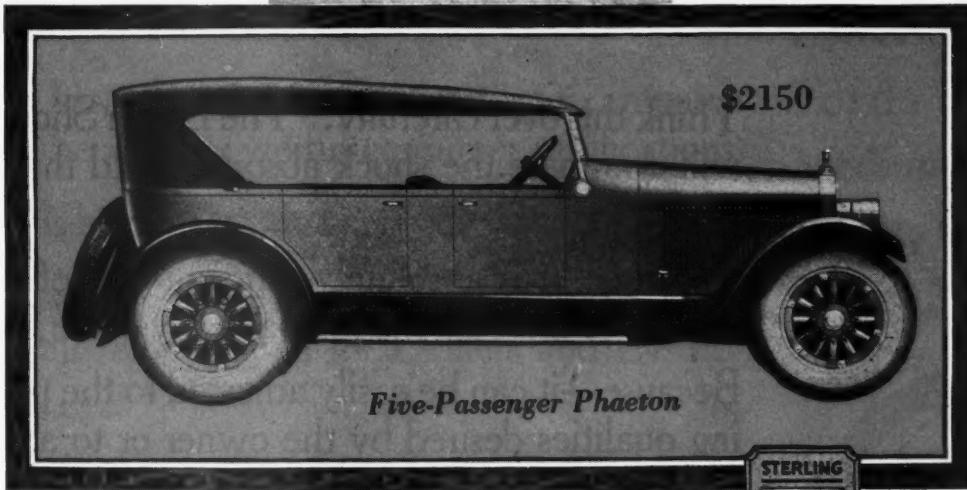
The Sterling-Knight, because it is a highly developed Knight type six and because of its "selling price" finds a ready market among the thousands of Knight enthusiasts.

Cars are ready for NOW deliveries—One of the best automotive merchants in the country says:

"It is much better to sell the Sterling-Knight than to compete with it."

The Sterling-Knight Company  
Warren, Ohio

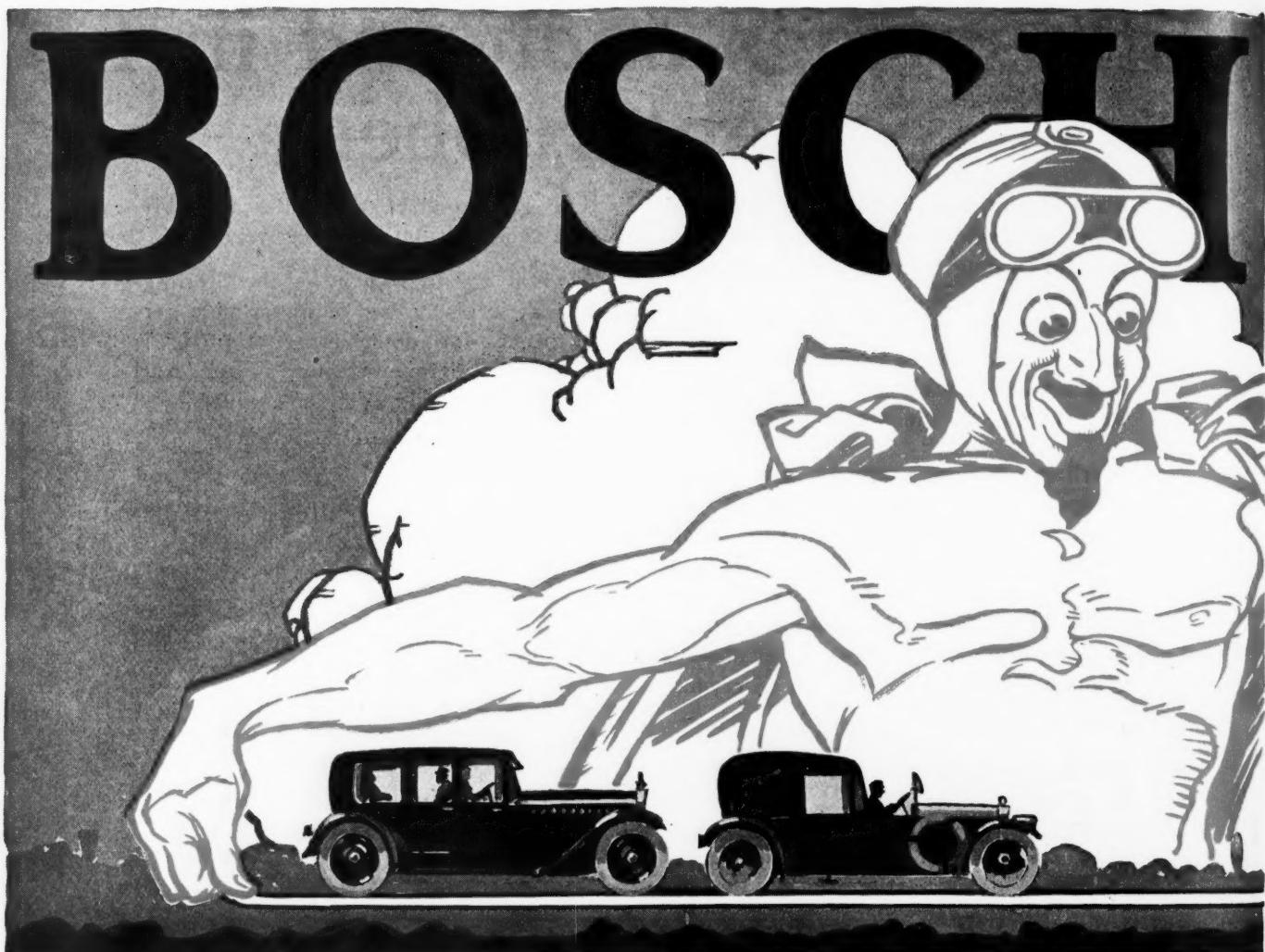
# STERLING-KNIGHT



FOUR PASSENGER  
SPORT  
\$2250  
  
FIVE PASSENGER  
PHAETON  
\$2150  
  
FOUR PASSENGER  
BROUGHAM  
\$2750  
  
FIVE PASSENGER  
SEDAN  
\$2800



All prices at Warren, Ohio



## *Smooths the Road*

Think this over carefully: The Bosch Shock Absorber will dominate the shock absorber field throughout the country—

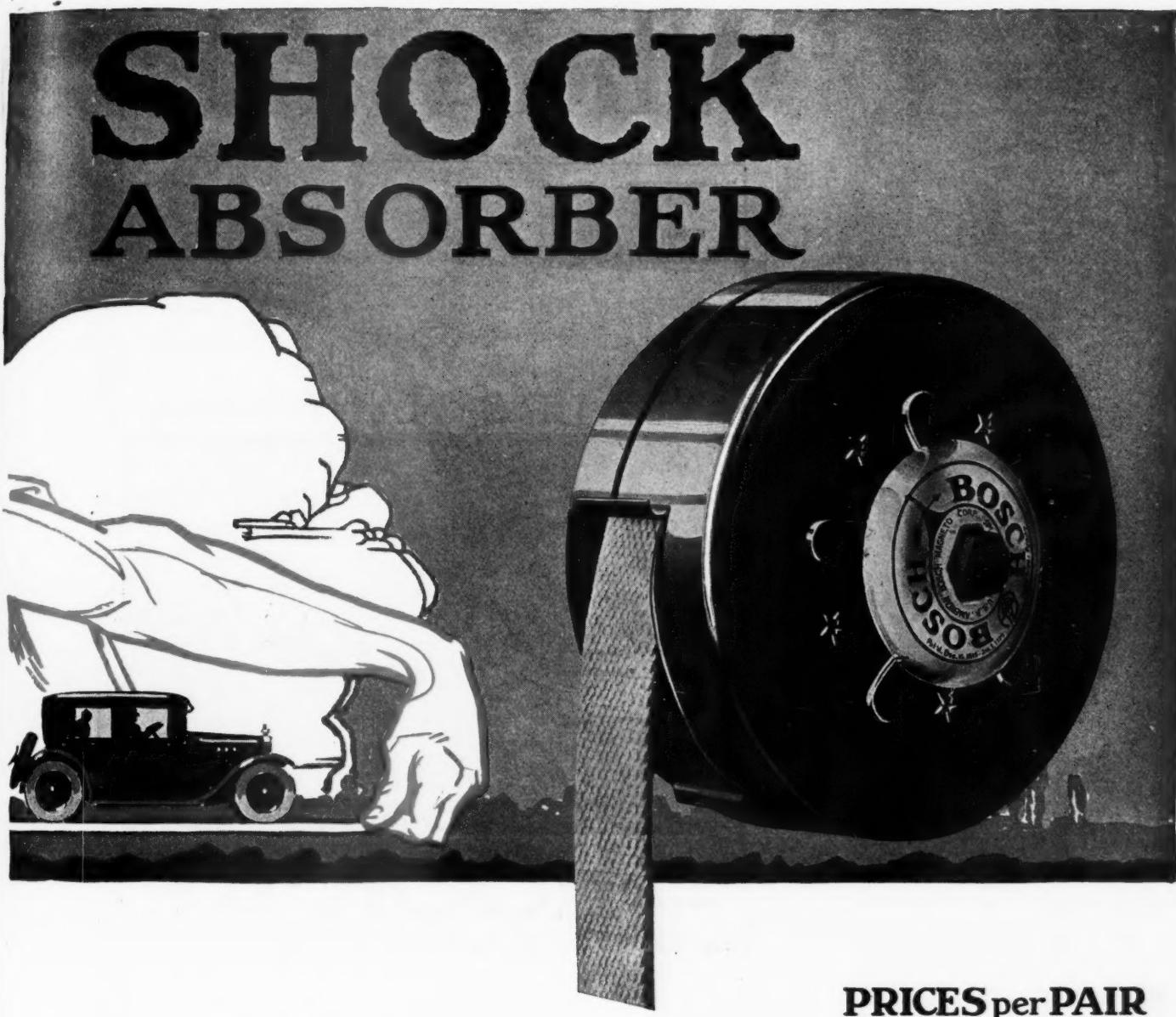
Because—it is absolutely efficient and effective at all times. It smooths the road and saves the car.

Because—it can be easily adjusted to the particular riding qualities desired by the owner or to any particular kind of road, and once adjusted, it seldom—if ever—requires further attention.



### AMERICAN BOSCH

Main Office and Works: Springfield, Mass.



Because—it has a big, national advertising campaign behind it in the most powerful consumer publications.

Because—it is backed by the Bosch Guarantee of complete satisfaction.

Territories still remain open for Dealers and Distributors.

Write today for a sample set at quantity discounts—  
C. O. D.—and begin now as a Bosch dealer.

#### PRICES per PAIR

Fords \$10<sup>00</sup>

Medium Cars \$15<sup>00</sup>

Heavy Cars,  
and Trucks \$20<sup>00</sup>

## H MAGNETO. CORPORATION

Branches: New York Chicago Detroit San Francisco

# Who wants to go

*Progress and profit come only through effort that is properly and intelligently expended. Logical and intelligent merchandising is covered thoroughly in this book.*



## A SALES HANDBOOK



### The HOOK-UP AS IT AFFECTS SALES AND PROFITS

**F R E E**

Get the handbook on merchandising. This edition is limited—write for your copy.



# Want to go somewhere?

**T**HE dealer who wants to put his business on its most profitable basis—who really wants to go somewhere—must be a complete merchandiser. He must know how to sell—of course—but he must also know how to buy—good buying is as necessary as good selling.

The automotive trade is approaching the stage in its development when each community will have its leading dealers who will control the bulk of patronage and carry off the lion's share of profits. Who will these leaders be? Will you be one of them?

The answer to these queries rests with you. If you make yourself a complete merchandiser—if you master your whole job—your chances are bright.

This handbook here offered free covers the whole job of automotive merchandising. It lays down the fundamental principles of buying as well as of selling but with emphasis on buying because it is less understood.

The Norwesco "Hook-up" which is good buying applied to the merchandising of automotive chemicals, is also described in this handbook. You will want to read this handbook. It may be the means of setting you straight on certain things.

It's free—write for your copy.

THE NORTHWESTERN CHEMICAL CO.  
MARIETTA, OHIO



**Se-Ment-Ol**

the original self acting Radiator Repairer. Millions of cans have been sold. Poured into the radiator it circulates freely throughout the cooling system finding leaks almost instantly and sealing them with a firm elastic repair that is permanent. It is guaranteed harmless and non clogging and if kept in the cooling system, guaranteed to keep it watertight.

**T**HE Norwesco line of automotive chemicals covers the whole range of automotive needs. Each product is of the highest quality and guaranteed.

- SE-MENT-OL Radiator Repairer
- TOP AND UPHOLSTERY DRESSING
- MOHAIR Waterproofing TOP DRESSING
- KHAKI Waterproofing TOP DRESSING
- PENETRATING OIL for springs
- VALVE GRINDING COMPOUND
- RIM AND GASKET SHELLAC
- BLACK AIR DRYING ENAMEL
- AUTOMOBILE ENAMEL
- TRANSMISSION COMPOUND
- CUP GREASE
- Linseed and Olive Oil Soaps

# NORWESCO PRODUCTS

This coupon is for  
your convenience  
—use it.

Northwestern  
Chemical Co.,  
Marietta, Ohio.

Gentlemen: — Please forward  
a copy of your Sales Handbook—The  
**HOOK-UP**.

Name .....

Address .....

**There is  
an Apex  
Jobber  
Near You**

Akeley-Steele Co., Aurora, Ill.  
Albany Hdw. & Iron Co., Albany, N. Y.  
A. E. Supply Co., Parkersburg, West Va.  
American Motor Equip. Co., Boston, Mass.  
Andrea & Sons, Julius, Milwaukee, Wis.  
Auto Supply Co., Nashville, Tenn.  
Automobile Equipment Co., Detroit, Mich.  
Automotive Specialty Co., Chicago, Ill.  
Augusta Grocery Co., Augusta, Ga.  
Ayres Auto Supply Co., St. Joseph, Mo.  
Bahl's, H. M. Hdw. Co., Lafayette, Ind.  
Bailey Co., James, Portland, Me.  
Bailey-Lebby Co., Charleston, S. C.  
Bantlin Co., J. J., Cincinnati, O.  
Beals, McCarthy & Rogers, Buffalo, N. Y.  
Beck & Corbitt Iron Co., St. Louis, Mo.  
Beckley-Ralston Co., Chicago, Ill.  
Beckley-Ralston Co., Detroit, Mich.  
Beckley-Ralston Co., Pittsburgh, Pa.  
Beckley-Ralston Co., St. Louis, Mo.  
Benton-Bailey Co., Richmond, Va.  
Berrodin Auto Supply Co., Philadelphia, Pa.  
Blish, Mize & Stillman Co., Atchison, Kans.  
Bonniwell-Calvin Iron Co., Kansas City, Mo.  
Brown-Rogers Co., Winston-Salem, N. C.  
Bowman Bros., Ltd., Regina, Sask., (C.)  
Bowman Bros., Ltd., Saskatoon, Sask., (C.)  
Burwell, J. B. Supply Co., Oklahoma City, Okla.  
Butts & Ordway Co., Boston, Mass.  
Campbell, F., Auto Sup. Co., St. Louis, Mo.  
Can. Fairbanks-Morse Co., St. John, N. B., (C.)  
Canadian General Elec. Co., Toronto, Ont., (C.)  
Carolina Motor Supply Co., Greensboro, N. C.  
Cedar Rapids Auto Sup. Co., Cedar Rapids, Ia.  
Central Auto Equipment Co., Springfield, Ill.  
Champion Auto Supply Co., Columbus, O.  
Chanslor & Lyon Co., Fresno, Calif.  
Chanslor & Lyon Co., Los Angeles, Calif.  
Chanslor & Lyon Co., Portland, Ore.  
Chanslor & Lyon Co., Oakland, Calif.  
Chanslor & Lyon Co., Seattle, Wash.  
Chanslor & Lyon Co., San Francisco, Calif.  
Chanslor & Lyon Co., Spokane, Wash.  
Chanslor & Lyon Co., Tacoma, Wash.  
Chicago Auto Supply House, Chicago, Ill.

# Genuine APEX

## Stop Piston Slap



### Only rounded points of contact assure results

"Apex Innerings" with rounding points of contact, with the inside of the ring and the reverse curves, contacting with the ring groove, make them extremely flexible. When compressed to enter the cylinder they automatically adjust themselves to conform to the space between the ring and piston. "Apex Innerings" therefore cannot cause too much wall pressure, as is the case with sharply crimped rings, which are too rigid; cause trouble and may break because of the sharp crimping process.

The "rounded points" directly give the results you want and that feature is patented by the manufacturer of "Apex."

**THOMSON MFG. CO.**

**PEORIA**

**Dept. C.**

**ILLINOIS**

Chicago Mtr. Supply Co., Chicago, Ill.	Cooper Rubber Co., I. J., Indianapolis, Ind.	Emerson & Fisher, Ltd., St. John, N. B., (C.)	Gibson Co., Indianapolis, Ind.
City Auto Co., Bridgeport, Conn.	Cranfill Co., Howard, South Bend, Ind.	Empire Motor Supply Co., Chicago, Ill.	Graham-Seltzer Co., Peoria, Ill.
Clark-Smith Hdw. Co., Peoria, Ill.	Crump Co., Benj. F., Richmond, Va.	Farrar-Brown Co., Portland, Me.	Gross, Phillip Co., Milwaukee, Wisc.
Clemons Auto Supply Co., Eau Claire, Wisc.	Cummings & Emerson, Peoria, Ill.	Farrel Auto Supply Co., Brooklyn, N. Y.	Hdw. & Sup. Co., Akron, O.
Collins Co., E. B., Danville, Ill.	Dine-DeWeen Co., Canton, O.	Farrel, Ozemur & Kirk Co., St. Paul, Minn.	Herring Motor Co., Des Moines, Iowa
Cooper Rubber Co., I. J., Columbus, O.	Dougherty, J. J. Co., Milwaukee, Wisc.	Fort Wayne Iron Store Co., Fort Wayne, Ind.	Hersh Hdw. Co., F., Allentown, Pa.
Cooper Rubber Co., I. J., Cincinnati, O.	Dyke Motor Supply Co., Pittsburgh, Pa.	Fort Worth Auto Supply Co., Fort Worth, Texas	Holiday, W. J. & Co., Indianapolis, Ind.
Cooper Rubber Co., I. J., Dayton, O.	Electric Appliance Co., Chicago, Ill.	Gaul, Derr & Shearer Co., Philadelphia, Pa.	Hub Cycle Co., Boston, Mass.
Cooper Rubber Co., I. J., Nashville, Tenn.	Electric Appliance Co., Dallas, Texas	General Automotive Sup. Co., Harrisburg, Pa.	Horton-Gallo-Creamer Co., New Haven, Conn.
Cooper Rubber Co., I. J., Knoxville, Tenn.	Electric Appliance Co., New Orleans, La.	General Motor Equip. Co., Mitchell, S. Dak.	Hutchisson, T. T. Co., Wheeling, W. Va.
		General Motor Supply Co., Altoona, Pa.	Illinois Auto Sup Co., Decatur, Ill.

**Look for the Guarantee Tag**



**20c Each**

up to  $\frac{3}{8}$  in. wide or 5 in. diameter. Larger 35c Each. "Apex Innerings" are the ORIGINAL.

"Genuine Apex Innerings" enjoy a nation-wide reputation. All good jobbers—most responsible dealers, have found this product a big profit maker—and—a wonderful builder of good will. Refer to the jobber list. Everyone is prepared to fill your order. If your favorite one is not listed, write us.

"Genuine Apex Innerings" are positively guaranteed to stop oil pumping, stop piston slap—and put the motor in good shape without reboring.

Our national advertising is constantly increasing the demand. Order your "Apex" NOW.

**THOMSON MFG. CO.**

**PEORIA**

**Dept. C.**

**ILLINOIS**

Jamestown Hdw. Co., Jamestown, N. Y.	Lewis Motor Mart Co., Dayton, O.	Minneapolis Ir. Store, Minneapolis, Minn.	Nicols, Dean & Gregg, St. Paul, Minn.
Janney, Semple, Hill & Co., Minneapolis, Minn.	L. & L. Motor Supply Co., Sioux Falls, S. Dak.	M. & M. Co., Cleveland, O.	Norfolk Motorist Supply Co., Norfolk, Va.
Johnson Tire & Auto Co., Montgomery, Ala.	Lowe, Co., George A., Ogden, Utah	Motor Mercantile Co., Salt Lake, Utah	Norris & Sons, R. W., Baltimore, Md.
Jones Hdw. Co., Richmond, Ind.	Lowe Motor Supplies Co., New York, N. Y.	Montana Hdw. Co., Butte, Mont.	Northway, Thos. J., Rochester, N. Y.
Kelly-How-Thomson Co., Duluth, Minn.	Marshall-Wells Co., Duluth, Minn.	Motor Supplies Co., LaPeer, Mich.	Northwestern Auto Sup. Co., Billings, Mont.
Kimball & Co., E. D., Chicago, Ill.	Mersick, C. S. Co., New Haven, Conn.	Motor Supply Co., Phoenix, Ariz.	Oliver Bros., Inc., New York, N. Y.
Kopac Bros., Omaha, Nebr.	Meadows-Price Co., Roanoke, Va.	McRae, H. A. & Co., Troy, N. Y.	Orr Iron Co., Evansville, Ind.
Kruse Hdw. Co., Cincinnati, O.	Michigan Acc. Co., Grand Rapids, Mich.	McClung & Co., C. M., Knoxville, Tenn.	Ozburn-Abston & Co., Memphis, Tenn.
LaCrosse Auto Sup. Co., LaCrosse, Wisc.	Miller-Morse Hdw. Co., Winnipeg, Man. (C.)	National E. & A. Sup. Co., Peoria, Ill.	Pa. Rubber & Supply Co., Cleveland, O.
Lee Hdw. Co., Salina, Kans.	Mills-Morris Co., Memphis, Tenn.	National Mill Sup. Co., Fort Wayne, Ind.	Pa. Rubber & Supply Co., Oil City, Pa.

**There is  
an Apex  
Jobber  
Near You**

Peaslee-Gaulbert Co., Louisville, Ky.  
Peden Iron & Steel Co., Houston, Tex.  
Randall-Dodd Auto Co., Boise, Idaho.  
Rappole & Robbins, Inc., Jamestown, N. Y.  
Reinhard Bros., Minneapolis, Minn.  
Roberts, H. C. Elec. Co., Philadelphia, Pa.  
Robinson's Auto Sup. Co., Aurora, Ill.  
Robinson Bros. & Co., Louisville, Ky.  
Roper-Harris & Dun Auto Co., Greenville, Texas.  
Severin Tire & Sup. Co., Oklahoma City, Okla.  
Severin & Co., Tulsa, Okla.  
Shadbolt-Boyd Iron Co., Milwaukee, Wis.  
Sharp Auto Sup. Co., Oklahoma City, Okla.  
Sheridan Auto Sup. Co., Chicago, Ill.  
Sieg Company, Davenport, Ia.  
Sherwood-Hall Co., Grand Rapids, Mich.  
Sheffer & Rossum, St. Paul, Minn.  
Stadtler Auto Sup. Co., Houston, Texas.  
Syracuse Auto Sup. Co., Syracuse, N. Y.  
Tarbell-Watters Co., Springfield, Mass.  
Tenk Hdw. Co., Quincy, Ill.  
Tisch Auto Supply Co., Milwaukee, Wis.  
Treman, King & Co., Ithaca, N. Y.  
Tri-State Motor Co., El Paso, Tex.  
Tucker, O. D. IV & Co., Little Rock, Ark.  
Utica Cycle & Sup. Co., Utica, N. Y.  
Van Camp Hdw. & Ir. Co., Indianapolis, Ind.  
Vermont Hdw. Co., Burlington, Vt.  
Waite Auto Sup. Co., Providence, R. I.  
Washington Auto Sup. Co., Peoria, Ill.  
Washington Auto Sup. Co., Washington, Ill.  
Western Mtr. Sup. Co., Minneapolis, Minn.  
Western Mtr. Sup. Co., Milwaukee, Wis.  
Wholesale Auto Sup. House, Tampa, Fla.  
W-K Supply Co., Albert Lea, Minn.  
Winne, L. S. Co., Kingston, N. Y.  
Wilkinson, J. G. Co., Newburgh, N. Y.  
Williams Hdw. Co., Minneapolis, Minn.  
Wooten, J. P. Co., Abilene, Tex.  
Woodwell, Jos. Co., Pittsburgh, Pa.  
Wyoming Automotive Co., Casper, Wyo.  
York Supply Co., Greenville, O.

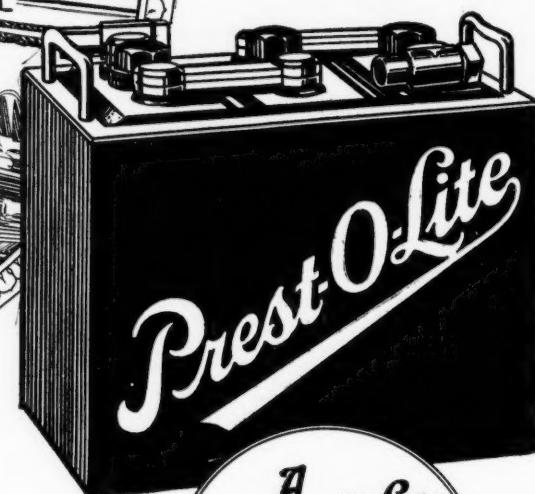
**Substitutes are dangerous!**



Charging Prest-O-Lite  
Batteries at the Speed-  
way Plant.



The Sign of "Friendly Service"  
Service Stations Everywhere



## Prest-O-Lite Batteries are *more* than "Just Batteries"

They combine the best knowledge of battery construction and highest quality in materials. They are built by skilled craftsmen who have had years of experience in fine battery building.

That's why Prest-O-Lite Batteries are absolutely dependable. There can be no better battery than Prest-O-Lite.

Back of every Prest-O-Lite Battery stands the Prest-O-Lite reputation for dependable products through twenty years. The national scope of Prest-O-Lite offers to the motorist service—known throughout the land as "Friendly Service."

---

THE PREST-O-LITE COMPANY, INC.  
INDIANAPOLIS, IND.

New York: 30 East 42nd Street      Pacific Coast: 599 Eighth Street, San Francisco  
In Canada: Prest-O-Lite Company of Canada, Ltd., Toronto

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For complete details of  
Prest-O-Lite Batteries  
write to Indianapolis.  
Ind., Dept. 5.

A  
Prest-O-Lite  
Product

WORLD'S  
LARGEST MANUFACTURER  
OF ACETYLENE, "THE GAS  
OF A THOUSAND USES."  
—  
BATTERIES FOR AUTOMOBILES,  
FARM LIGHTING, RAILWAY  
SIGNALS AND  
RADIO.

# Prest-O-Lite

THE OLDEST SERVICE TO MOTORISTS

# HERE YOU ONLY A TACK IN A MAP?

Are you being "used" by some big-production factory to break its sales record?

Or, are you being helped to own and conduct your own business in a *business* likeway?

Why work hard, put many cars on the streets, tie up your profits in used cars and have hanging over you all the time the liability that some big-production sales manager will pull you out and put another tack in your place?

At Auburn there is no pressure on you to scurry around to finance and sell a factory-set quota.

In the Auburn you have a complete, established line of wonderful sixes at competitive prices.

You have cars built with unhurried care. Service expense at a minimum—owner satisfaction at the peak!

You set your own quota!

You never are forced to make bad trades. The bag you hold is full of profits—not depreciated second or third hand cars.

Auburn dealers are independent merchants with normal blood pressures. They don't know what it is to be a tack in the map.

AUBURN AUTOMOBILE COMPANY  
Auburn, Indiana



# AUBURN MOTOR CARS

# STONE

**"That's the Idea!  
~ Give Me One"**

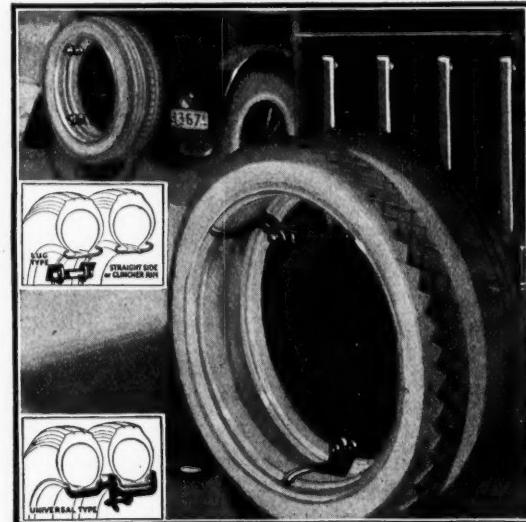


Every motorist instantly recognizes the value of the Stone Tire Carrier—to him. They substitute double safety, and make three sales for you in each instance, since each Stone Tire Carrier sold opens the way for the sale of a rim, tire and tube. Fits any car, without ropes or straps. Neat, compact, simple, strong, the triplicate parts are of electro-galvanized malleable iron, silver finished. They lock securely to the regular spare, with no chafing or interference with tire covers, tail light or license plate. On or off quick.

A Stone Tire Carrier fits *and is fit* for any car. Stone Tire Carriers list for \$3.00 for set of three for Straight Side Rims; \$2.50 for Clincher Rims, and \$1.00 for Lug Type for Fords.

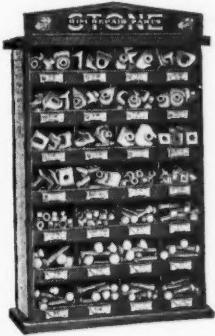
Get in touch with your jobber and order today.

**The Stone Manufacturing Company**  
1502 South Michigan Avenue, Chicago  
135 Wooster Street, New York



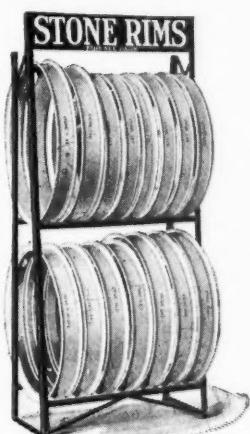
# STONE Tire Carrier

# STONE



## FREE For Your Bigger Sales!

With the assortment of Stone Rim Parts that you order, we present you with this steel Display Cabinet—with our compliments.



Store Rim Rack  
for display purposes

**"Glad I Saw Them—  
Just What I Need"**

If you stock Stone Rim Parts, you get to be known to your customers as a *complete* supply station. And more sales are born! Most motorists need to see to *buy*—Stone Rim Parts are put up in a handsome steel cabinet to meet this condition. We consider good display vital to your cash register's prosperity, so we give you this display cabinet *free* when you order a full assortment of Stone Rim Parts. Or, if you order a smaller assortment, a Display Board is presented you. And striking window cards with both.

Stone Rim Parts fit every car that rolls around to your door. Lugs, bolts and nuts of high-quality, tough malleable iron. They fit right and tight—yet with plenty of margin for profit.

Stone Rims are just as dependable and demanded as Stone Rim Parts. They are standard—made for every make and model.



**The Stone Manufacturing Company**  
1502 South Michigan Avenue, Chicago

135 Wooster Street, New York

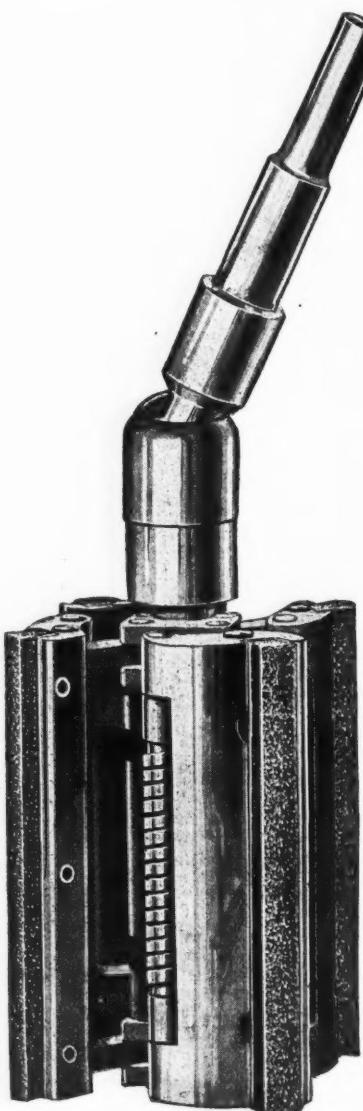
# STONE Rims and Rim Parts

*Self-Aligning — Self-Adjusting — Self-Centering*

## The AMMCO

Cylinder Re-Conditioning Tool

One size handles ALL cylinders from  
 $2\frac{15}{16}$  in. to 5 in. bore. Operated by ANY  
 standard  $\frac{1}{2}$ -inch portable electric drill.

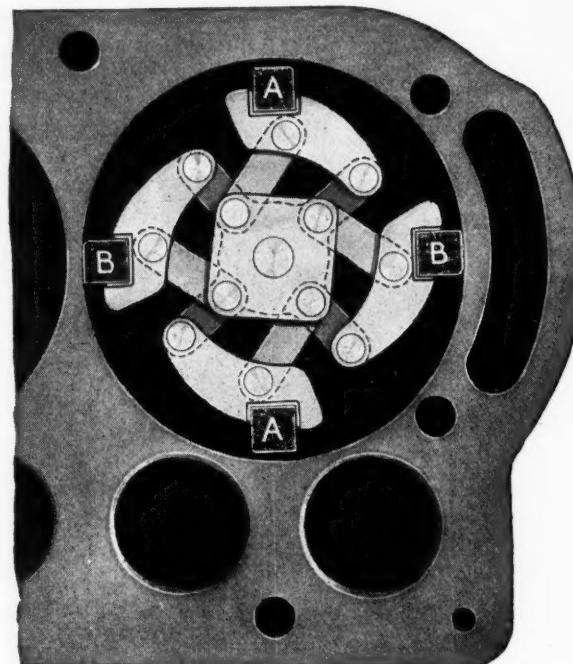


Automotive Maintenance Machinery Co.,  
 551 W. Washington St., Chicago

We certainly want to know more about the  
 AMMCO Cylinder Re-Conditioning Tool. Send us  
 your bulletin by return mail.

Name .....

Address .....



## An Automatic Feature That Insures a Perfect Bore

You will always get a perfect cylinder re-conditioning job with the AMMCO. It simply cannot follow any inaccuracies of the bore, such as taper or out-of-roundness. The interconnection and hinging of the wings [a patented feature of the AMMCO] keeps all stones parallel and at the same radial distance, thereby insuring a ROUND and PARALLEL hole.

Another thing! The AMMCO is self-aligning and self-centering. The tool expands automatically to fit the cylinder bore. There are no adjustments to make. Just watch the cylinder bore for diameter, as the tool corrects and resizes the cylinder.

No expert is required, and yet the AMMCO produces a surface of glass-like smoothness that makes "wearing-in" unnecessary. The AMMCO makes a busy shop and quickly earns big profits. Send for our latest bulletin on Cylinder Re-Conditioning with the AMMCO.

*Now—don't forget to use the handy coupon.*

**Automotive Maintenance Machinery Co.**

551 West  
 Washington St.



Chicago, Ill.

# Kentucky Thoroughbred

## "Your One Best Bet"

Because accessories must do more for you than merely produce profits, — tho profits are necessarily a first consideration.

Kentucky Thoroughbred Accessories will do more for you. They will make friends and identify your organization as dispensers of honor, integrity and quality, as well as, automotive merchandise. That is why they are **Your One Best Bet**. They carry a trade-mark which we consider a promissory note to deliver value for value received.

### *The* Oil Saturated Non Drying Out Cup Leather



### In Every

Kentucky Thoroughbred Pump, you will find a cup-leather that is permanently oil-saturated, by a process developed and exclusively used by us. No amount of neglect — in months of storage under a car seat — can defeat its oil-saturation and perfect functioning. It puts the Kentucky Thoroughbred Line in a dominant place on the American Market. Inquire. Investigate. Compare.

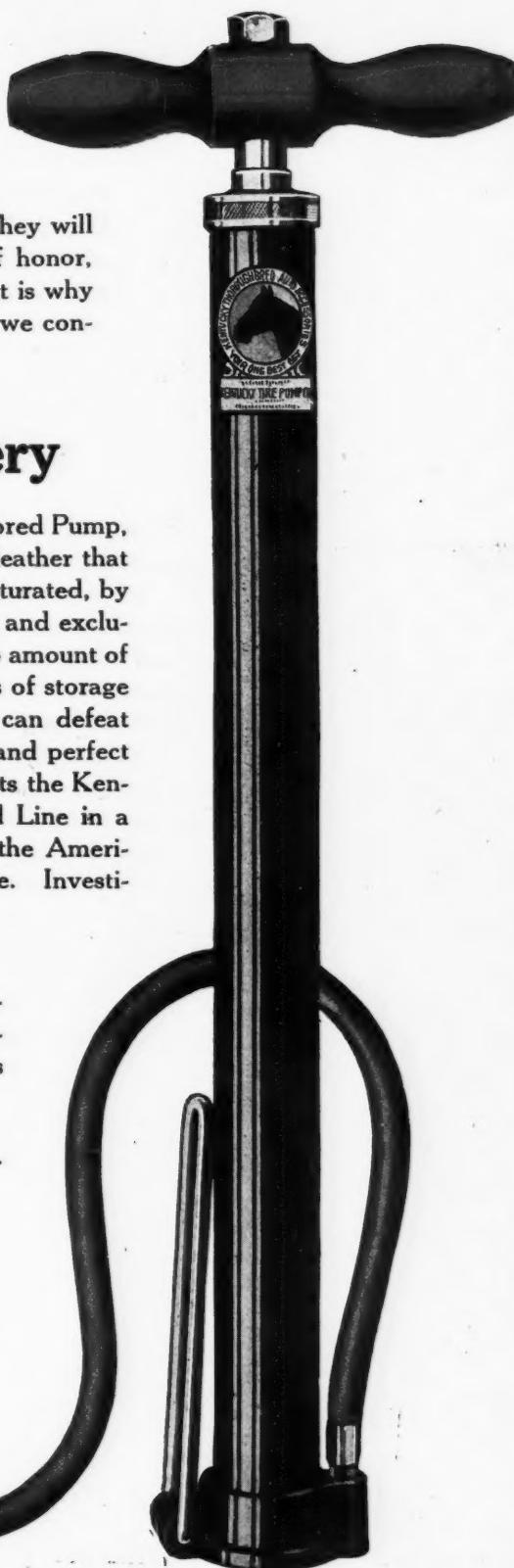
The Kentucky Thoroughbred Line includes a complete assortment of tire-pumps, retailing from \$1.25 to \$4.00; cast aluminum step-plates; steering-wheels for Fords, Chevrolets, Stars and Overlands; extra spare-tire carriers.

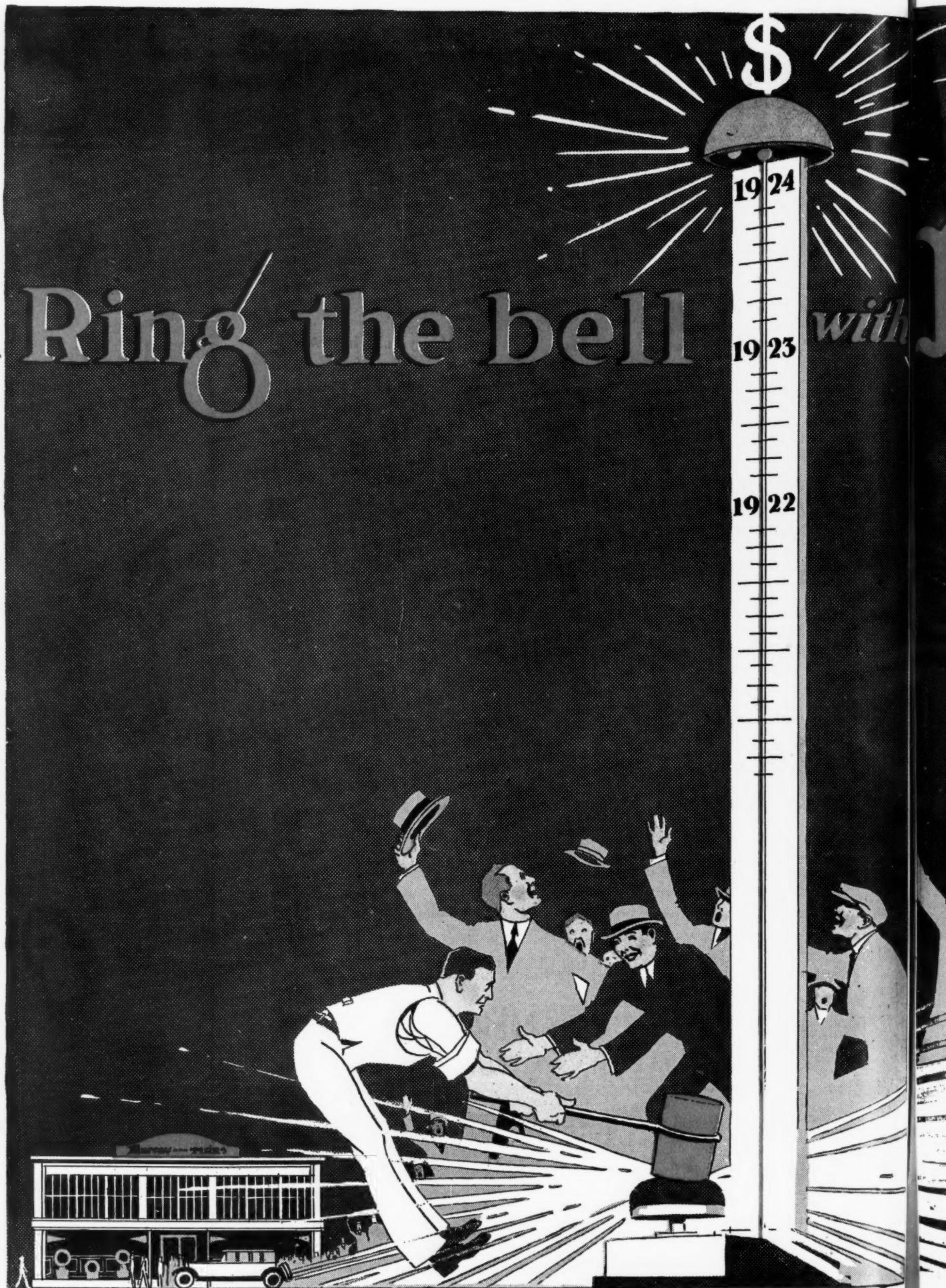
Ask for information on our complete line or individual items.

**KENTUCKY PUMP MFG. CO.**  
**EVANSVILLE, INDIANA**



MANUFACTURED BY  
KENTUCKY PUMP MFG. CO.  
EVANSVILLE, IND.





# Murray "Not A Worry" TIRES

DURING their two years of steadily increasing popularity, Murray Tires have built up for their exclusive dealers an average business of \$35,000 a year with numerous accounts running well over \$100,000. These handsome rugged casings have also won for themselves a reputation for long mileage, at a reasonable price, that will be of immeasurable help to dealers who expect to "ring the bell" in 1924.

We'll be glad to send you the names of these wide-awake dealers who through rapidly changing market conditions, have enjoyed continual prosperity. Their success speaks more convincingly of the quality of

Murray Tires than all the rubber, fabric and tread arguments in the world.

Write for our exclusive dealer's proposition. Be the sole distributor in your community for this quality Tire. We will be glad to discuss our distribution plan and show you how we can sell such a good tire at such a reasonable price.

Murray Rubber Co.  
Trenton, N. J.



**Rickenbacher**  
A • CAR • WORTHY • OF • ITS • NAME

# This Could Happen Only In America

Shortly after the close of the great war a group of men founded a new automobile company.

True, they were all men of ripe experience in the designing and building of motor cars.

So, inasmuch as "Any product is as old as the combined experience of the men who make it"—the Rickenbacher car was not new in the sense that it was an experiment. Still the company, as such, was new.

And it planned to break into an industry that wiseacres said was impregnable.

It entered the field that is the most truly competitive of any industry in the world.

The new corporation was relatively small.

And there were Giants in Those Days.

That concern is today a recognized leader.

Believing most profoundly that he who has a better article to offer—he who will perform a better service—will always find a place in American business life;—

Determined to be a leader and not a mere camp follower;—

Resolved to give better value;—

Confident that buyers would reciprocate with their patronage;—

That concern—Rickenbacher Motor Company of Detroit — has

achieved one of the greatest successes ever recorded in American industrial history.

Its conquest is an inspiring thing to contemplate.

Its progress has been one of which every American may well be proud.

Contrasted with some recent events, this Rickenbacher achievement is heartening and reassuring to the youth and idealism of our land.

For Rickenbacher has proved that initiative cannot be "cornered;"

That ability cannot be curbed;

That enterprise cannot be monopolized.

Possessing youth, vision, engineering ability, this group of specialists produced an automobile that has revolutionized standards.

For three successive years the Rickenbacher exhibit has been the center of attraction in the New York Automobile Show—Mecca alike of engineers and laymen. Many mechanical features you first saw in this car have since found their way into cars selling for twice as much.

Among these are:—

A Vibrationless Motor; Tandem Fly Wheels; Steel Disc Wheels; Automatic Air Cleaner; Ball-Bearing Steering; A new system of spring suspension; Eight-inch ("Double Depth") Frame;—And 4-Wheel Brakes.

## 4 ~ Wheel Brakes

# Rickenbacker

A • CAR • WORTHY • OF • ITS • NAME

In this last improvement Rickenbacker produced a veritable upheaval not only in brake standards but in chassis design throughout.

Some makers who were caught napping, refer to this as "calamitous."

Surely that was not Rickenbacker's fault.

The sun must rise even though its heat may wilt over-ripe blossoms!

It is good to know—and Rickenbacker's success has proven—that opportunity is not yet dead in this land of ours—carpings of the unfit and the indolent to the contrary notwithstanding.

There are still Giants in this industry. But none need fear them.

They have their place—and so long as they perform a service, will live.

Rickenbacker has proven, however, that mere size is neither an advantage nor a disadvantage.

—Save that, a larger body must move slower of course!

Some day, perhaps, Rickenbacker will also be a Giant among industries.

We are not nearly so ambitious for that, however, as we are to consolidate our reputation for building a finer automobile.

A car of distinction and individuality.

But regardless of how imposing we may become, we will always recall the conditions that made possible this success.

And we shall never forget that advantage can be maintained only so long as a better service is rendered.

There will always be room for the enterprise and the youth of our land—always room at the top.

This is the great lesson taught by the signal success of Rickenbacker.

Do you not agree with us that this is good for all of us?

Do you not glory in the fact that this is still true?

If Rickenbacker has made a better motor car;—

If, in a word, we have produced a car that in every detail of advanced engineering, style and finish, is in accord with the mode of the moment;—

And if the motoring public appreciating these things, have in turn accorded us their patronage so generously as to have made our success phenomenal;—

Then we are glad.

And you as an American have equal cause to be grateful.

Need we say that we are eager to carry on in this glorious contest for supremacy through service.

We appreciate our obligation and will hold true to our course, hoping to justify their continued confidence.

They have accorded the name an high place among the automobile manufacturers of the world.

We shall see to it that every car that leaves our shop is indeed "A Car Worthy of Its Name."

Rickenbacker Motor Company  
Detroit Michigan

*Sport Phaeton, \$1595*

*Coupe, \$2035*

*Sedan, \$2135*

*Prices are f. o. b. Detroit—plus war tax*

## 4 ~ Wheel Brakes



*More than 85 per cent of all cars and trucks produced in this country, Fords excluded, are factory equipped with AC Spark Plugs. Among these cars are:*

Buick	Hupmobile
Cadillac	Jewett
Chalmers	Jordan
Chandler	LaFayette
Chevrolet	Marmon
Chrysler Six	Maxwell
Cleveland	Nash
Dodge Brothers	Oakland
Dort	Oldsmobile
Durant	Paige
Essex	Peerless Six
Hudson	Star
	Yellow Cab

This tremendous, ready-made market for AC's is right at your door and will always be there in ever-increasing size.

*There is a type and size for every motor*

The dealer who stocks the well-known AC Spark Plugs is handling fast-moving, profit-making merchandise, and his market is assured by factory equipment business.

The AC 1075 for Fords is a big seller because it is a better plug for Ford engines—it satisfies the owner and makes money for the dealer.

## SPARK PLUGS SPEEDOMETERS

*The accurate, easily installed AC Speedometer for Ford can be sold to every Ford owner*

AC



AC Spark Plug Company, FLINT, Michigan

*Makers of AC Spark Plugs—AC Speedometers*

U. S. Pat. No. 1,135,727, April 13, 1915. U. S. Pat. No. 1,216,139, Feb. 13, 1917  
Other Patents Pending



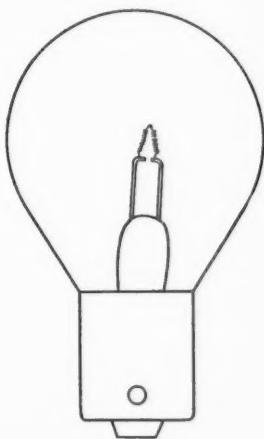
# TUNG-SOL

## Rapid Turnover Means Greater Profits

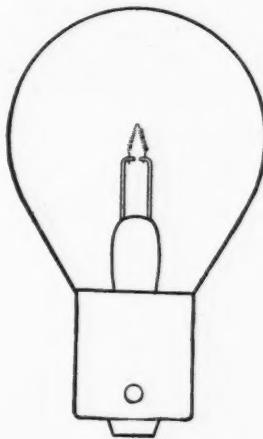
**T**HE many notable features of TUNG-SOL, the precision and care with which it is built, distinguishes TUNG-SOL from the ordinary bulb, and owners long ago learned that for *correct* illumination they must have TUNG-SOL.

Dealers find that TUNG-SOL repeats. Once an owner uses this bulb, he is seldom content with any other. A rapid turnover means greater profits. There is a TUNG-SOL for every automotive need and—TUNG-SOL "Fixed-Focus" bulbs with the filament accurately centered. When used with a reflector having a permanently "fixed" socket, filament is exactly at focal center of the reflector.

THE DIFFERENCE BETWEEN TUNG-SOL AND ORDINARY BULBS. *TALK NO. 4*



In many bulbs, the mount carrying the filament is not in perfect axial alignment with the center of the bulb. This means that the bulb cannot be correctly focused without bending the socket.



The mounts of all TUNG-SOL bulbs are perfectly placed along the axis of the bulb. The adjustment of a reflector socket is all that is necessary to obtain correct illumination.

*"Let TUNG-SOL Light the Way"*

MINIATURE INCANDESCENT LAMP CORPORATION  
NEWARK, N. J.

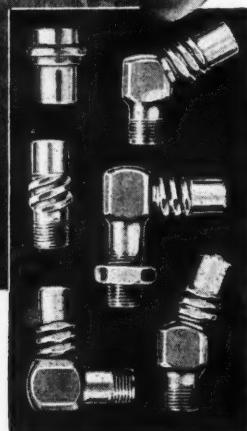


Trade Mark

Licensed Under General Electric Company's Incandescent Lamp Patents.



All nipples are made of one-piece steel. They stand the severe strains and stresses of the road and will not shake off; check valve retains the lubricant from escaping or dust and grit from entering through the opening. Nickel-plated dust caps with the DOT "Snap" fastener patent are easy to take off and put on. Will not shake off.



Automatic valve opens and closes itself upon attaching and detaching nozzle. Cannot leak. Only one working piece, nothing to get out of order.

Nozzle "locks" firmly on nipple — absolutely leak-proof. The greater the pressure, the tighter the connection.

The DOT has been tested and adopted by the U. S. War Department, standardized by 69 manufacturers of trucks and cars, and used as standard equipment in more than 100 leading industries in America. DOT Service and supplies are easily available everywhere.

# These Nipples bring the corners around ~

It is easy to reach with one hand, even the most remote lubricating points of your truck, when you use the DOT System. The one-piece steel nipples with elbows of every angle bring the corners around while the one-hand operation of the gun makes it possible to reach all parts without awkward stretching and without getting hands and clothing all covered with grease.

**In 13 minutes or less you can lubricate the entire chassis!** And you can do a thorough job. With a progressive pressure from 1 to 3,000 pounds, the DOT forces out all the gritty, gummed-up matter and replaces it with fresh lubricant.

The automatic valve retains the lubricant after the nozzle is disengaged, making it possible to use oil as well as grease or kerosene for flushing frozen bearings.

Make it easy for your men to lubricate your trucks and they will always keep your trucks properly lubricated. You will get longer and more dependable service at lower operating costs. Fleet owners who are now using the DOT are demonstrating that fact every day. One large fleet owner states that he saves more than \$3,000.00 per year since adopting the DOT System on his trucks. What would such a saving mean to you?

**Dealers:** Send for the attractive Dot stock Cabinet and demonstrator. Place it in a conspicuous place on your counter and display it in your window. It will bring new customers and create many profitable sales.

Made only by  
Carr Fastener Co., 31-a Ames St., Cambridge, Mass.

"Makers of the DOT line of fasteners"

Branches  
40 Selden Ave., Detroit      Gage Ave. & Beach Rd., Hamilton, Ont., Can.  
Monadnock Bldg., San Francisco      47 W. 34th St., New York City

The  
**DOT**  
TRADE MARK  
*high pressure*  
**LUBRICATOR**



The American Automobile Mechanic is the most resourceful workman in the world.

*He has the answer  
to our question*

## What can you do with a drill?

### 3 PRIZES GIVEN

- 1 Your unrestricted choice of a DU ( $\frac{1}{2}$ " Heavy Duty) Drill, complete with drilling stand, or a combination ( $\frac{1}{2}$ " Heavy Duty) Drill, complete
- 2 All Ball-bearing type CUD drill.
- 3 A  $\frac{1}{4}$ " Automatic Drill.

You've put a drill to all kinds of uses, you've worked out unusual jobs of your own that perhaps no one else has ever thought of. Tell the world about them through us and compete for the prizes here offered.

We are publishing a handbook edited by the good mechanics of America. Help us complete it.

We want to send you a copy of the first edition of our book. When you get it, you will see that you can help us by telling one practical method you have developed for handling some job your own way in your shop.

- What 1 Mail the coupon and get the book,  
to do 2 then—  
            Write your answer.

3 Mail it before May 1st, 1924—  
closing date of contest.

MA-17

The UNITED STATES  
ELECTRICAL TOOL CO.  
CINCINNATI, OHIO.

THE U. S.  
ELECTRICAL  
TOOL CO.  
Cincinnati, Ohio

Gentlemen:—Please send me a copy of the Handbook and prize offer.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

### FREE

All you need is this book and your experience to try for a prize! Send the coupon for your copy today—it's free!



This Book Sent Free—Prizes Given Too



## Here They Are Big Boy!



Write today for booklet on Bonney "CV" wrenches. Overseas shop cap sent free to those who ask for it.

All the power in your mighty fist won't break one of these wrenches. They're made of *Chrome-Vanadium*—the super steel.

This Bonney Engineer's Set No. 25 contains six "CV" 15 degree angle wrenches with twelve different openings— $\frac{3}{8}$ " to 1". They fit a large range of sizes of U.S.S. nuts, S.A.E. nuts and Hex. Cap. Screws. Bonney "CV" Wrenches are more than twice as strong as carbon steel wrenches. They are guaranteed to strip the thread of any standard S. A. E. nut or break the bolt before the jaws will spread.

Set No. 25 costs you \$5.00. Leatherette roll 85c. extra. This price is for points east of the Mississippi; slightly higher elsewhere.

We also make special service wrenches and shop tools of Chrome-Vanadium. Mention jobs you're most interested in when writing for particulars.

Made in U. S. A. by the

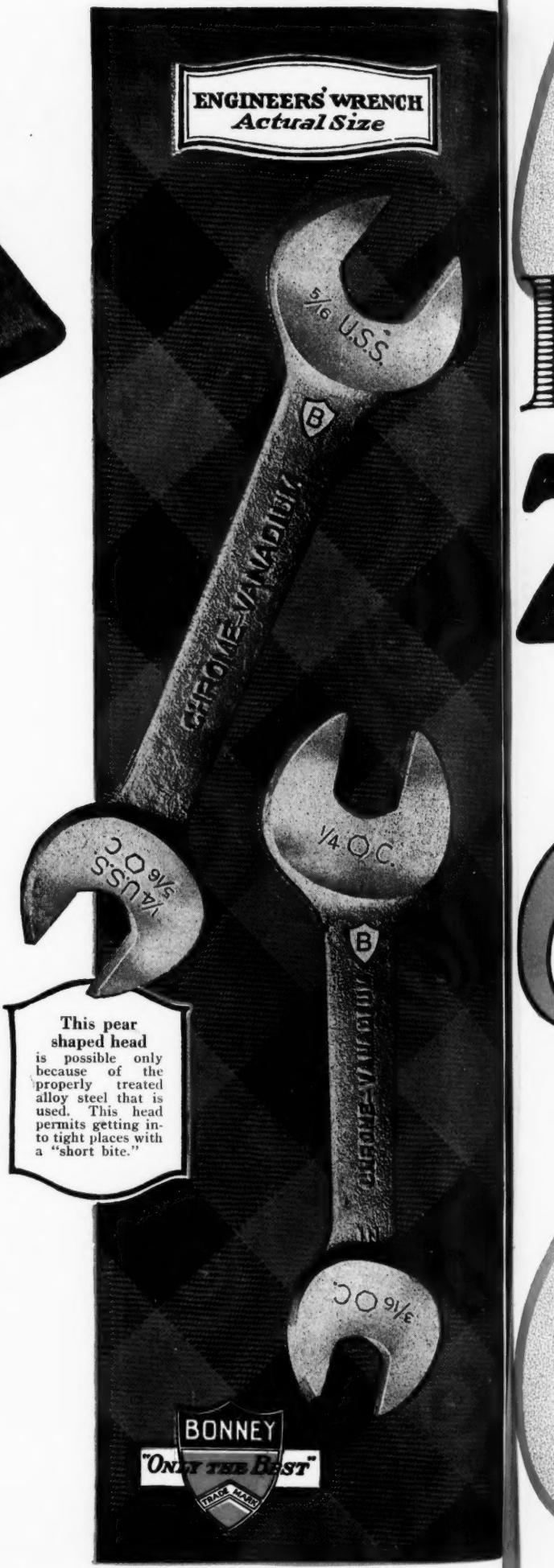
**BONNEY FORGE & TOOL WORKS**  
ALLENTEW, PA.

Also makers of carbon steel drop forged wrenches, Stillson wrenches, vises and Drop Forgings.

# BONNEY

Chrome-  
**CV**  
Vanadium

# WRENCHES



# FYRAC

## Z Spark PLUGS FOR FORDS

60  
C



Z stands for a special Fyrac Spark Plug made for Ford motors. Z is the symbol of a sure spark, a long life and a low price. Advertised in The Saturday Evening Post—selling fast for dealers everywhere. A two-piece plug, easy to take apart. Order your Fyrac Z Spark Plugs from us today. Send for "Z" booklet. Fyrac Manufacturing Co., Rockford, Ill.

*Fyrac Regular Plugs, one INCH firing surface, \$1 each. Made by the makers of the Fyrac Night Guide, the super windshield spotlight*

ATTRACTIVE NEW  
DISCOUNTS



**Our Advertising Reaches  
Your Customers**

Alabama .....	101,259	Nebraska .....	323,986
Arizona .....	11,810	Nevada .....	6,036
Arkansas .....	105,564	New Hampshire .....	23,894
California .....	387,350	New Jersey .....	61,219
Colorado .....	111,615	New Mexico .....	22,767
Connecticut .....	40,856	New York .....	214,594
Delaware .....	8,922	North Carolina .....	146,291
D. of C. ....	3,991	North Dakota .....	101,012
Florida .....	52,114	Ohio .....	408,288
Georgia .....	121,859	Oklahoma .....	246,627
Idaho .....	57,311	Oregon .....	74,550
Illinois .....	447,993	Pennsylvania .....	277,333
Indiana .....	333,602	Rhode Island .....	12,109
Iowa .....	528,273	South Carolina .....	86,099
Kansas .....	380,928	South Dakota .....	131,923
Kentucky .....	180,841	Tennessee .....	142,021
Louisiana .....	43,421	Texas .....	211,049
Maine .....	37,736	Utah .....	23,602
Maryland .....	41,620	Vermont .....	24,765
Massachusetts .....	75,502	Virginia .....	124,352
Michigan .....	188,513	Washington .....	119,194
Minnesota .....	264,842	West Virginia .....	111,282
Mississippi .....	66,097	Wisconsin .....	259,201
Missouri .....	427,626	Wyoming .....	25,718
Montana .....	54,569	F'rgn. & Misc. ....	79,837

**We are out to Break All Sales  
Records in 1924**

Our powerful 1924 advertising will blanket every state. Every dealer will profit by it. We are telling over 7 million people why the Rose is the world's easiest tire pump. Explaining the famous Rose Valve. Selling them on the "quality tire pump at popular price" idea.

This is nothing new for Rose. For years we have advertised successfully. We have made Rose the favorite American tire pump.

You will find a ready sale and liberal profit in a stock of Rose Tire Pumps. Order from your jobber.

**FRANK ROSE MFG. CO., HASTINGS, NEBR.**

**ROSE**  
**TIRE PUMP**

# "REWOUND" means Absolutely "RENEWED" When We Do It!

As pioneers in the armature rewinding field we have all the perfected facilities equal to a plant making new armatures.

Any one of the 8000 rewound armatures we keep in stock is equal in every way—appearance—quality—and service—to its new counterpart.

Or—we will rewind the one you send if desired.

## Prices

Ford Armature Re-wound, \$2

Any Two Unit Generator Armature Rewound \$5



## Bears Our Guaranty

A "Yellow Band" Guaranty is placed on every armature that leaves the plant. But before this band is attached the armature is given every service test. This guaranty is the endorsement of a big, reliable house, and as good as a bond.

Stock up now by having your old armatures rewound.

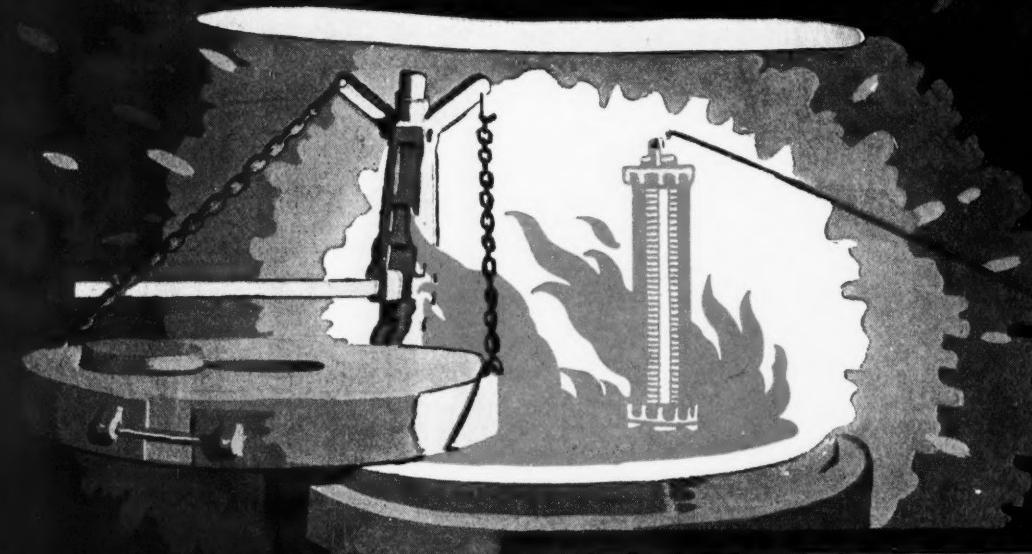
**U. S. AUTO SUPPLY CO.**

*Armature Service Division*

3845 S. Wabash Ave., Chicago



# HEAT-SHAPED to insure perfect roundness



The Exclusive Pedrick Heat-Shaping Process  
Enables Pedrick Heat-Shaped Rings to Stand  
Up Under the Most Severe Working Conditions!

A SERIES of tests conducted to determine piston-ring leakage has proven Pedrick's claim to perfect roundness, equal radial pressure, and unequaled performance under all working conditions.

At 800 r. p. m. Pedrick's leakage was 28% less than that of its nearest competitor.

And at 2000 r.p.m. Pedricks stood alone! They were the only ring of those tested that showed less leakage at 2000 r.p.m. than at 800 r.p.m.!

The cost? Pedrick Heat-Shaped Rings—the finest rings on the market—are sold at almost the price of a snap ring! The Oil Ring is sold at the same price as the compression ring! Write for the complete list of sizes and discounts.

WILKENING MANUFACTURING COMPANY  
15th and Mt. Vernon Streets Philadelphia, Pa.

Pedrick  
HEAT-SHAPED  
PISTON RINGS

Reproduction of one of the AC 1075 Ads in The Saturday Evening Post

# A good plug for Fords!



Here is why the AC 1075 is a good plug for Fords

### Spring Terminal Clip

makes it easy to test plug or coil while motor is running and locks nut so that it will not unscrew. There is no danger of damaging connection through use of pliers as the clip keeps it tight.

### Heavy Body Porcelain

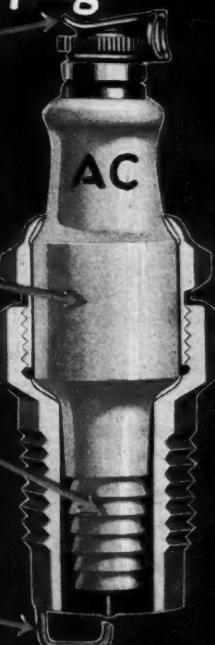
to withstand hard service—plug comes apart by unscrewing bushing.

### High Temperature Fins

Plugs become shorted by deposits of carbon. The thin edges of the fins on the patented carbon proof porcelain get hot quickly and burn away the deposits, thus preventing accumulation of carbon.

### Heavy Electrode

designed to form natural drain so no oil will lodge in spark gap.



INSTALL A SET OF AC 1075's TODAY—YOUR MOTOR WILL PERFORM BETTER

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs—AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending.

*How the AC 1075 is being advertised in national publications to the Ford owner*

Thousands of dealers are building a big, profitable spark plug business among Ford owners on the AC 1075—a better plug for Ford engines—and you make a larger profit on them.

Write us for the attractive fibre poster, *in colors*, of the above advertisement which we have for you—to connect your store with this impressive AC advertising.

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs—AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915; U. S. Pat. No. 1,216,139, Feb. 13, 1917. Other Patents Pending.

# "Slap It Against Anything and Go Ahead!"



**Length**  
17 inches  
**Weight**  
16 lbs.  
**Speed**  
650 R.P.M.  
**Any Voltage to 250 Volts**

**Model G-D**      **Price \$56.00**

**TEMCO**  
Trade Mark  
**Half-Inch Garage Drill**

SOME months ago the Lynchburg Machine Works wrote us expressing their satisfaction with Temco Heavy Duty Drills, and among other things said:—"We don't pick the work for our Temco; just slap it against anything and go ahead."

There's a world of meaning in that comment. It takes Quality of a definite and dependable kind to render a service that will earn such confidence.

Usually, when a man wants to use a drill, he can't stop to question its fitness for the job. He must use it anyway, and trust to luck for results.

These distinctive TEMCO features give ample assurance of TEMCO quality:

Powerful Fan-Cooled Motor—that doesn't get hot; Highest Grade Ball Bearings—that eliminate friction; Oil Hardened Gears—that stand hard wear; Ball Thrust Bearing—removes all end friction; Quick-Break Switch—convenient and positive control; Off-set Chuck Spindle—permits close corner drilling; Finest Non-Kinkable Cable—easily renewed; and Motor Brushes—renewed without disconnecting wiring. In short, a Perfectly Balanced Tool, Light in Weight and Convenient in Shape.

If you want a Real Drill, ask your Jobber to send you a Temco on trial. Or, if your Jobber can't supply you, write us, giving your Jobber's name.

The Temco Electric Motor Co.  
704 Sugar St.  
Leipsic, Ohio

Western Sales Representatives  
ALLIED INDUSTRIES, INC.

455 Second St., San Francisco, Cal.  
1256 Factory Pl., Los Angeles, Calif.  
Southwest Sales Representative  
H. M. Cree  
5507 Miller Ave., Dallas, Tex.

1252 First Ave., S., Seattle, Wash.  
53 Fourth St., Portland, Ore.  
Southern Sales Representative  
Hinsig-Hart Co.  
Nashville, Tenn.



**SPECIFICATIONS:**  
Length \_\_\_\_\_ 11½ in.  
Net Weight \_\_\_\_\_ 5 lbs.  
Any Voltage to 250 Volts  
Price \$28.00

**TEMCO** TRADE MARK  
Portable  
Electric Tools  
Drills-Grinders-Drilling Stands  
Been Making Them Since 1910

# EMPIRE New Process



# BOLTS

**"The Nut is  
Not Made  
That Can  
Strip This  
Thread"**



SOME day someone may produce a nut strong enough to strip the thread of an Empire New Process bolt.

But it hasn't happened yet.

So when you try to screw down a bad fitting nut, you're not going to spoil a perfectly good bolt.

Building up the thread by a new method, instead of cutting it, is the source of its tremendous strength. The molecular structure of the steel is not weakened, as it is in cutting. It is preserved.

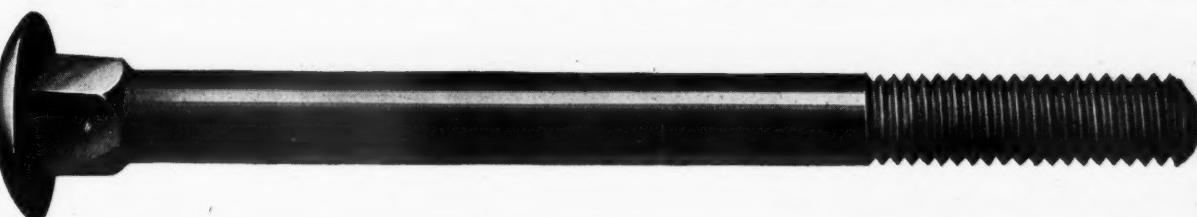
But to achieve this, and at the same time secure the

gauge-like accuracy which is one of the important features of Empire New Process bolts, requires a new type of precision tool which is found only in the Empire plant.

The new bolts are now procurable in quantity lots at no advance in price over other Empire bolts.

**RUSSELL, BURDSALL & WARD  
© BOLT & NUT COMPANY ©**

PORT CHESTER, N.Y.  
VEMBERWICK, CONN. • CHICAGO • SAN FRANCISCO • ROCKFALLS, ILL.  
*Makers of Bolts, Nuts and Rivets Since 1849*



# KINGSTON products have been known to motorists for a Generation

KINGSTON Ignition devices have been known to motorists for more than a quarter of a century. The experienced dealer knows that there will be, day in and day out, a steady and remunerative demand for products of the Kingston line.

It is this factor that has made the Kingston line so popular with dealers everywhere. They know that every motorist knows Kingston products, that motorists have been buying them for years, and will continue to buy them. Correctness of design, the test of materials and the utmost care in workmanship have contributed to that unswerving confidence that motorists everywhere have in the name Kingston.

Most dealers are cashing in on this steady demand, and have been for many years. For the dealer who is not acquainted with Kingston products, or who does not feel that he is getting his full share of this business, we have an interesting story to tell. Drop us a line.

**KOKOMO ELECTRIC COMPANY**

KOKOMO, INDIANA

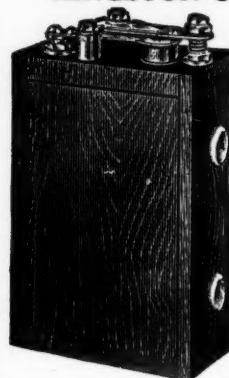
## KINGSTON GENERATOR CUT OUT

Wise dealers know there is no better Cutout at any price than the Kingston. It is expertly made, and is built to last. Furnished with curved base to fit the Ford generator or with flat base for use on any six-volt system.



LIST PRICE \$1.00

## KINGSTON COIL UNIT

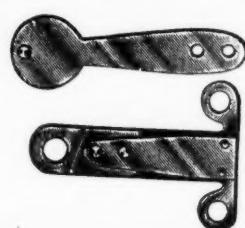


LIST PRICE \$1.75

MILLIONS of Kingston Coil Units are in use. They have given excellent service on Ford cars for many years, and are recognized as wholly dependable.

## KINGSTON POINTS

Kingston Contact Points are extra large in size, and are suitable for use both on Ford cars and Fordson tractors. Buy the genuine!



LIST PRICE  
20c per set

# KINGSTON

# GATES BELTS

*"The Standardized Fan Belt"*

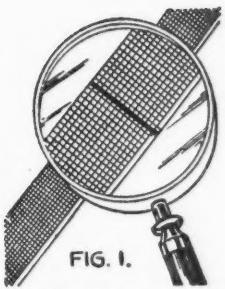


FIG. 1.

Ordinary fan belt.  
Threads run lengthwise  
and across. To break  
this belt on the marked  
line only the lengthwise  
threads need be broken.

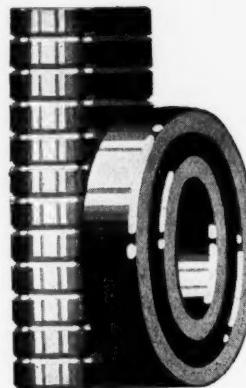
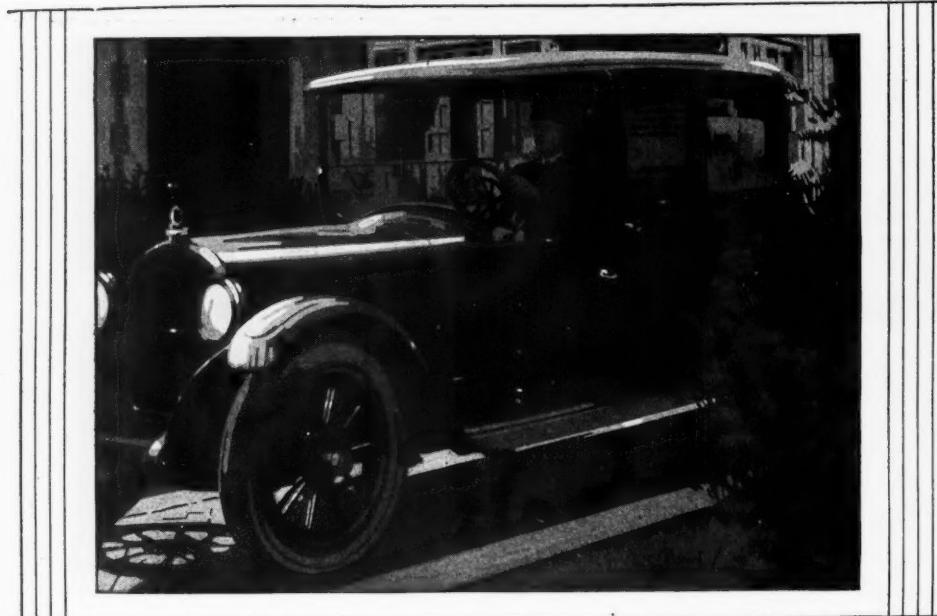


FIG. 2.

Gates Vulco Belt.  
Threads run diagonally.  
To break this belt every  
thread both lengthwise  
and across must be bro-  
ken. This bias weave  
construction is patented.

These diagrams tell  
why Gates Vulco Belts  
are delivering extra  
service—it's due to  
the bias weave con-  
struction (patented.)

Made by the World's Largest  
Manufacturers of Fan Belts.



# BEARINGS FOR EVERY APPLICATION

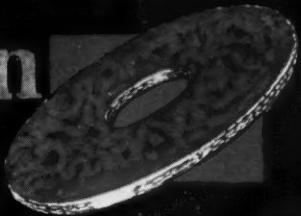
Ahlberg Ground Bearings are suitable for every replacement purpose at a much less cost than new ones. Call our *nearest* branch for full information~

*Branches in 37 cities*

A H L B E R G  
B E A R I N G  
C O M P A N Y

*321 East Twentieth St Chicago*



more enduring  
than  steel

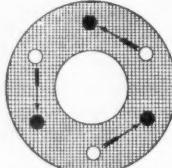
# Thermoid Hardy Universal Joint

*Outwears metal  
absorbs jolts...  
requires no oil  
or care*



*The twist ruined  
the shaft... but  
the joint held*

The diagram below shows the construction of the ordinary fabric universal joint. The black holes indicate the driving bolts, the white are the driven. Only the left-hand driving bolt pulls in the direction of the strands. The other two must pull on the bias. Contrast this with the extra strength made possible by the Thermoid-Hardy's fan-wise construction.




## 21,700 Inch-Pounds of Twist Failed to Strain the Fabric

**T**HAT a Thermoid-Hardy Joint will outlast a metal universal has been proven time and again by the long list of manufacturers who equip with Thermoid-Hardy.

But it remained for the Engineering Department of Purdue University to prove the endurance of a Thermoid-Hardy Joint as compared with a 2-inch, ten-gauge steel driving shaft.

The illustration (see preceding page) was made from a photograph. That picture shows what the steel shaft looked like after a 21,700 inch-pound twist. The Thermoid-Hardy Joints used in this experiment were not even strained.

From then on, we were sure that the "fan-wise" construction of the Thermoid-Hardy Joint was *right*.

What do *you* think is a good test of universal joint performance. Won't you make that test using a Thermoid-Hardy in comparison with any other joint on the market?

**THERMOID RUBBER COMPANY, Trenton, N. J.**

New York, Chicago, Los Angeles, Detroit, Atlanta, Seattle, Kansas City,  
Boston, San Francisco, Cleveland, London, Paris, Turin

*Makers of Thermoid Brake Lining, Thermoid Tires, Rexoid Transmission Lining*

### Some Thermoid-Hardy Users

Allis Chalmers Mfg. Co.  
American Bosch Magneto Co.  
American Motors Corp.  
Anderson Motor Co.  
The Autocar Co.  
Available Truck Co.  
Barley Motor Car Co. (Roamer)  
Bartlett Motor Truck Co.  
Chandler Motor Car Co.  
Cleveland Automobile Co.  
Continental Motor Co.  
Cooks Motor Corp.  
Cowan Truck Co.  
Crow-Elkhart Motor Corp.  
Jas. Cunningham Son & Co.  
Curtiss Aeroplane & Motor Co.  
Dart & Dyer Tractor Corp.  
Day & Elder Motor Co.  
Diamond T Motor Car Co.  
Doane Motor Truck Co.  
Dort Motor Car Co.  
H. H. Franklin Mfg. Co.  
Garford Motor Truck Co.  
Gramm-Bernstein Motor Truck Co.  
Hatfield-Penfield Steel Co.  
Hawkeye Truck Co.  
Haynes Automobile Co.  
Hendrickson Motor Truck Co.  
Holt Mfg. Co.  
Indiana Truck Co.  
International Harvester Co., of A., Inc.  
International Motor Co.  
Jackson Motors Corp.  
Jordan Motor Car Co.  
Kelly-Springfield Motor Truck Co.  
Kentucky Wagon Mfg. Co., Inc.  
Kissel Motor Car Co.  
Locomobile Co.  
Maxwell Motors Corp.  
McFarlan Motor Car Co.  
Mercer Motors Co.  
Moreland Motor Truck Co.  
Nelson & LeMoon  
E. A. Nelson Automobile Co.  
O'Day-Mell Motor Truck Co.  
Olds Motor Works  
Packard Motor Car Co.  
Parker Motor Truck Co.  
Patriot Motors Co.  
Pierce-Arrow Motor Car Co.  
Reo Motor Car Co.  
Republic Motor Truck Co.  
Rochester Motor Corp.  
Root & Van Dervoort Eng. Co.  
Sanford Motor Truck Co.  
Stewart Motor Corp.  
Stoughton Wagon Co.  
Studebaker Corp.  
Superior Products Mfg. Co.  
Traffic Motor Truck Co.  
Transport Truck Co.  
United Motors Co.  
Velle Motor Corp.  
Walter Motor Truck Co.  
Wilcox Trux Co.  
Willys-Overland, Inc.  
Worthington Pump & Machinery Corp.  
Yellow Cab Co.

# Thermoid-Hardy Universal Joint

# atmosphere and Engine Performance

That motors run better in cool damp weather is the "original discovery" of every new motorist—but the common knowledge of all old timers.

Engineers have known definitely, for years, why the weather affects engine performance. Tests showed them that a mixture of gasoline and air would explode completely only when the air was saturated with moisture.

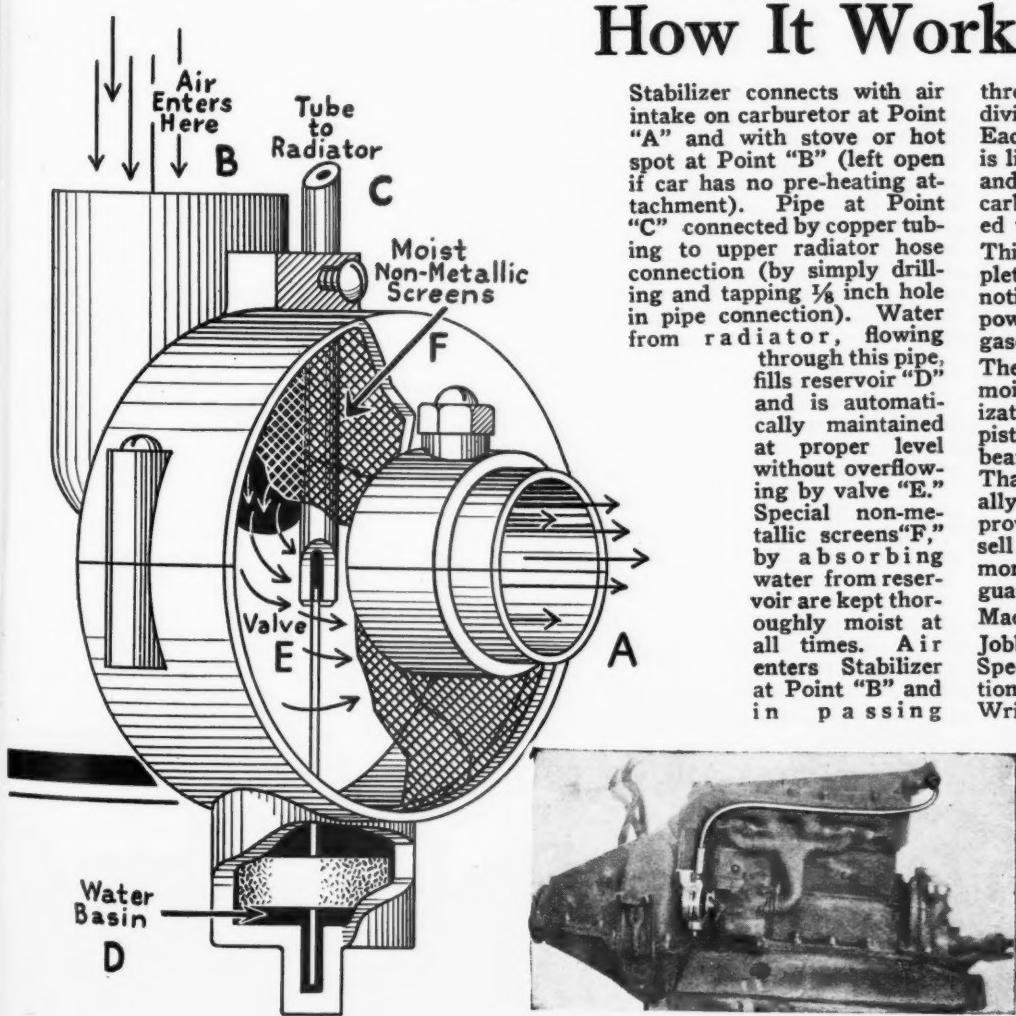
Knowing this they realized that engines would never be 100% efficient at all times until a means were discovered to mechanically reproduce perpetual damp weather conditions in the small area at the air intake on the carburetor.

While this seemed a simple proposition engineers and internal combustion engine experts have spent years striving to find the solution.

But it has remained for the engineers of the Lasco Corp. to solve the problem. In solving it they have gone a step farther and in the LaRose Air Stabilizer have produced a device that not only moistens air but cleans it as well. The Air Stabilizer moistens air by washing it—and accomplishes both with the utmost mechanical simplicity, there being only one moving part. It will last a lifetime. Consider the sales possibilities of such a device. Today, when air cleaners are the talk of the automotive world, becoming standard equipment on more and more cars, a device possessing the features of an air cleaner plus the features of a humidifier truly has plus sales possibilities.

**LASCO CORPORATION**  
NIAGARA FALLS, N. Y.

## The LaRose Air Stabilizer How It Works



Stabilizer connects with air intake on carburetor at Point "A" and with stove or hot spot at Point "B" (left open if car has no pre-heating attachment). Pipe at Point "C" connected by copper tubing to upper radiator hose connection (by simply drilling and tapping  $\frac{1}{8}$  inch hole in pipe connection). Water from radiator, flowing through this pipe, fills reservoir "D" and is automatically maintained at proper level without overflowing by valve "E". Special non-metallic screens "F" by absorbing water from reservoir are kept thoroughly moist at all times. Air enters Stabilizer at Point "B" and in passing

through wet screens "F" is divided into many small jets. Each of these minute sprays is literally washed of all dust and dirt and delivered to the carburetor clean and saturated with moisture.

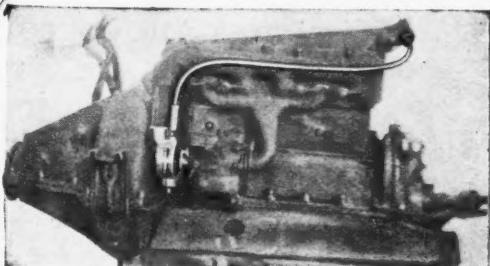
This moist air causes complete combustion with a noticeable increase in both power and speed and greater gasoline mileage.

The combination of clean, moist air eliminates carbonization and reduces wear on pistons, cylinder walls and bearings.

That the Air Stabilizer actually does these things is best proved by the fact that we sell it on a 30-day absolute money-back if not satisfied guarantee.

Made for all cars.

Jobbers inquiries solicited.  
Special distributor Proposition to dealers—  
Write.



Showing  
LaRose Air Stabilizer  
Installed on Ford  
Motor  
Easily installed on  
any motor in a few  
minutes.

# GET THIS DEALER SIGN →



**Steel  
Bottles  
Filled  
with  
Power**

**Refills 50¢**

**STEADY  
REPEAT  
SALES**

They'll keep coming back for REFILLS. You just hand them a REFILL for the old bottle and 50c. We supply you with REFILLS in exchange for empty bottles.

**Don't let business drive by—collect from the customers made by our steady advertising in**

**The Saturday Evening Post**

(10 million readers)

# PREST-AIR



**The wonderful new invention for  
inflating tires,  
jacking up cars,  
greasing cars,  
putting out auto fires**

Every man and woman now driving by your store will soon be interested in owning a Prest-Air Outfit—the result of our big national advertising campaign.

Beginning with our two-page announcement of April 19th, striking advertisements of Prest-Air will appear every fourth week throughout the year in *The Saturday Evening Post*, the most powerful advertising medium known.

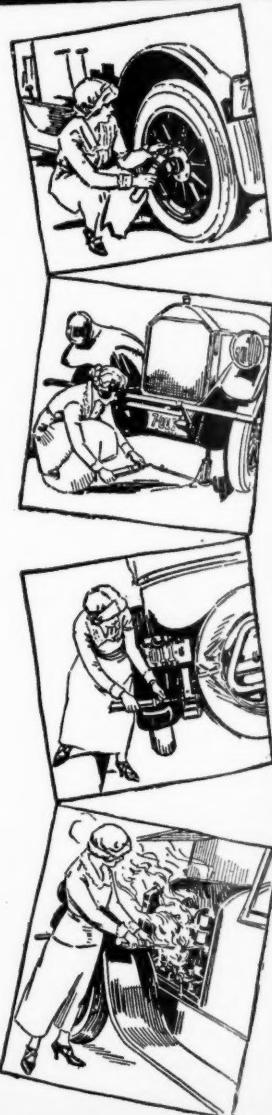
People will be looking for the "Prest-Air Service" Sign. Selling will start at once for the dealer who hangs this big enameled steel sign out in front. He will first sell every customer an outfit and then draw a steady revenue from him as the customer brings his discharged bottles back for REFILLS. (See lower left corner of this page).

This is volume business—fast selling and cumulative revenue from every customer. If you feel you are our man, write TODAY for our Plan.

**PREST-AIR CORPORATION**

General Offices: Grand Central Terminal Bldg., New York

# Prest-Air Power Bottle Outfits



# Business Is Good!

Since the day of the first Rollin announcement there has never been a particle of sales let-up.

On the contrary, Rollin dealers report that business is increasing at an exceedingly pleasing and profitable rate.

There are still a few who are unmindful of the fact that the Rollin is the only car in America which has a European type high compression motor, balloon tires and 4-wheel brakes.

Do you realize what this means as a money-maker for the dealer who handles this much sought-after car?

Touring Car - - - - -	\$ 995
Three Seated Coupe Roadster - -	1195
Five Passenger Sedan - - - -	1295

*Prices f. o. b. factory*

THE ROLLIN MOTORS COMPANY, CLEVELAND, OHIO

# ROLLIN



# *Every Fleet Owner Needs These Files!*

**Y**OU'LL reduce your cost of upkeep, avoid delays and practically assure your trucks a "round-trip-ticket" to the garage if you include these Files in each tool kit:

- One Tungsten Point File
- One 6" Slim Taper
- One 8" Half Round Bastard
- One 8" Mill Bastard
- One 10" Flat Bastard
- One 4" Warding Bastard

Your service station or dealer will explain their uses--and recommend the NICHOLSON brand for accurate cutting and permanent satisfaction.

**NICHOLSON FILE CO.**  
Providence, R. I., U. S. A.

**NICHOLSON**  
  
U.S.A.  
(TRADE MARK)



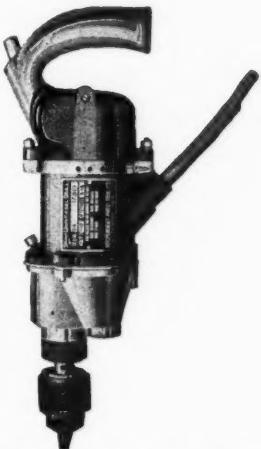
# **NICHOLSON FILES**

*~a File for Every Purpose*





**CATALOGED**  
*in the Red Directory*



THE INDEPENDENT  
PNEUMATIC TOOL CO.  
CHICAGO, ILL.

*Thor*



## Save the minutes



Every minute saved in the busy garage and service station is profit earned.

Tools that are dependable for their ease of operation, accuracy and durability require less time to use—do better, faster work and thereby save the minutes.

The Tooth and Sleeved Key device (an original Jacobs feature) gives the Jacob Chuck greater gripping power—makes it easier to use and insures more accuracy. These time saving features coupled with the quality construction of Jacobs Chucks has resulted in their being adopted as standard equipment by 132 makers of the industry's best Drilling Machines and Portable Drills.

Jacobs quality is responsible for this. Jacobs quality is your guarantee.

THE JACOBS MFG COMPANY, HARTFORD, CONN.

*This advertisement inserted in the interest  
of better Service Equipment in general and  
the use of Portable Electric Drills in particular.*



## For quick work

The simple job of attaching a stop signal is made an easier job and is accomplished in less time when a modern speed tool is used to drill the necessary holes.

A portable drill not only saves the valuable minutes—but does a neater job quicker and consistently earns its keep.

**"The World's Largest Producer of Drill Chucks"**

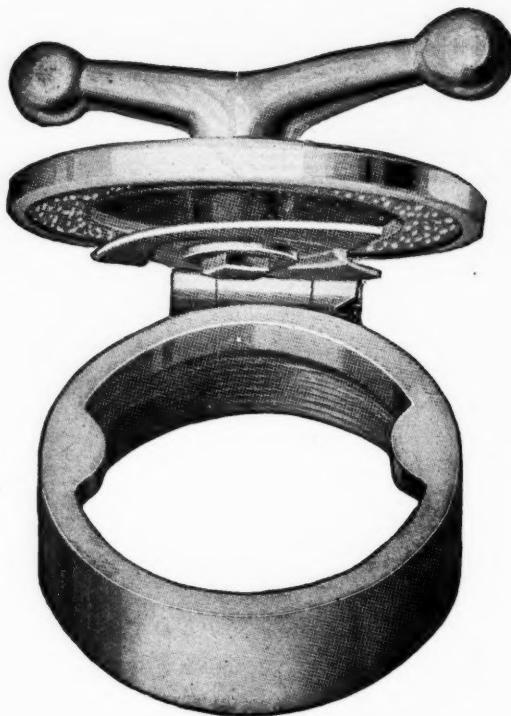
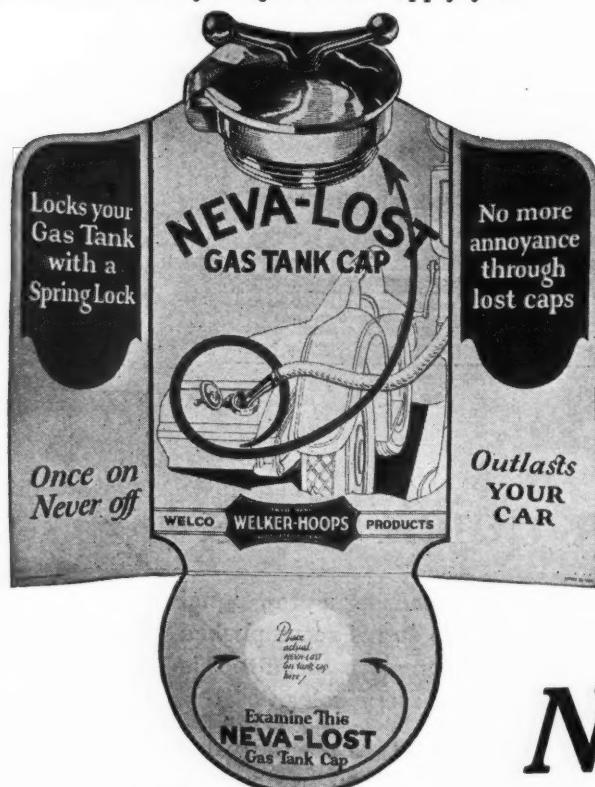
# Price Reduction!

## Welco "Neva-Lost" Gas Tank Caps Now Only \$1.50

Increased efficiency in production methods, with consequent lower costs for manufacturing, make possible this generous price reduction, from \$2.00 to \$1.50, on all sizes of Welco "Neva-Lost" Gas Tank Caps, with the exception of number twelve, which has been reduced to \$1.75. We prefer to pass this saving along to the consumer to stimulate the demand for you. These new prices will make every motorist buy.

Welco "Neva-Lost" Gas Tank Caps fit permanently on the gas tank—they can't be mislaid or lost at filling stations.

A quarter turn of the bar handle opens or locks the hinged top quickly—no unscrewing. Can also be used as radiator caps—sell them two at a time! Brass, highly nickel-plated. Assortment consists of fifteen caps that cover the sizes for over seventy makes of popular cars. Stock them now. Liberal discounts. Ask your jobber to supply you.



## New Display Stand

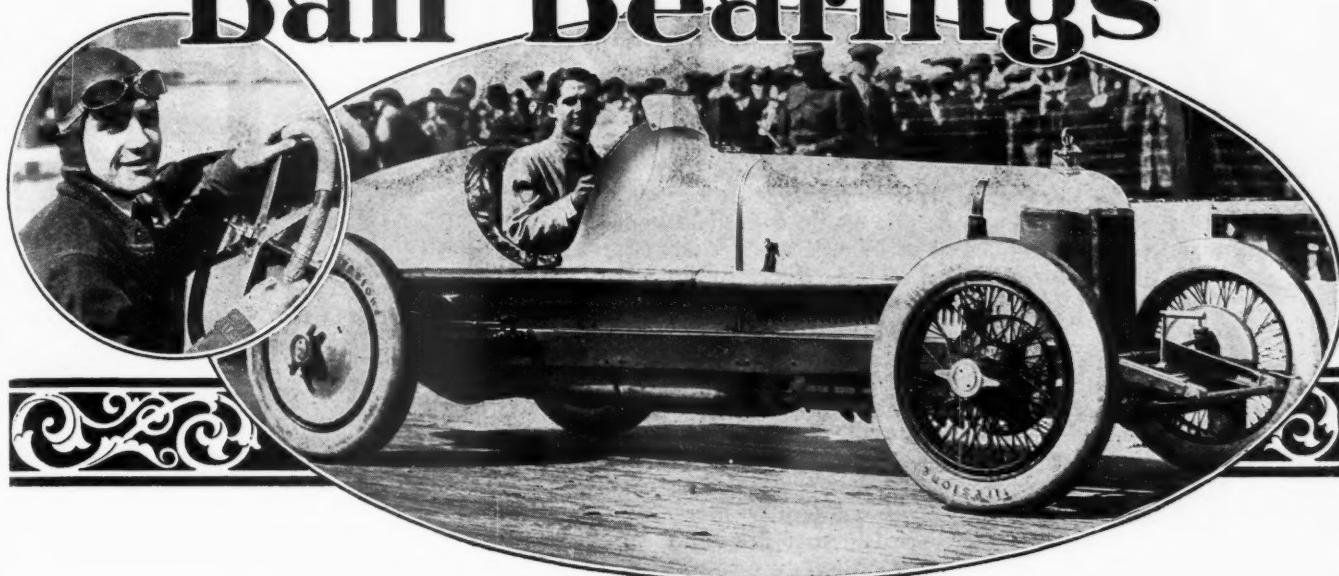
This new display stand will sell them for you. It's attractively designed in three colors with a place to put one of the caps for inspection. Let prospects examine one of the caps and they'll sell themselves. You get this live silent salesman with every assortment of Welco "Neva-Lost" Gas Tank Caps.

## Now Only \$1.50!

TRADE MARK  
**Welker-Hoops Mfg. Co.**  
Middletown, Ct.

**WELCO ACCESSORIES**

# New Departure Ball Bearings



**The Motor Car Manufacturers' Preference  
is the Racing Drivers' Choice, Too.**

**“A**S evidence of the durability of New Departure ball bearings,—  
driving a Wade Special I won the 250-mile Beverly Hills  
Race on February 24th without a stop, averaging 116 miles per hour  
*breaking five world's records.*

“My Wade Special was New Departure ball bearing equipped  
throughout, which I consider a large factor contributing to my suc-  
cessful finish.”

HARLAN FENGLER.

FENGLER'S victory marks the first race of the  
fifth year in which the great speedway classics have  
been won on New Departures. The same consistency  
applies to the automotive industry as a whole. New  
Departures outsell because they excel.



# PIERCE

SOME Pierce-Arrow distributors have been selling Pierce-Arrow cars for twenty years; many others have represented Pierce-Arrow for fifteen years; a still greater number have enjoyed ten years of success.

Would you like to become associated with a company whose dealers show such an unusual record of profitable business growth? The opportunity to do so now exists in certain localities.

Pierce-Arrow now faces, we believe, the greatest period in its twenty-three years' history. Never have its products—passenger cars, motor trucks and motor busses—been so eagerly sought.

We will be glad to discuss the attractive terms of the Pierce-Arrow franchise with reputable dealers. Write us, or visit us at the factory in Buffalo.

*The services of the Pierce-Arrow Finance Corporation have greatly widened the market for Pierce-Arrow products, enabling customers to pay out of income rather than capital, if desired.*

THE PIERCE-ARROW MOTOR CAR COMPANY  
Buffalo, N. Y.

PIERCE ARROW

# ARROW

"PRIDE OF ITS MAKERS MAKES YOU PROUD IN POSSESSION."



*Extension Screw Standard gives an additional height up to 7 inches and enables obstructions to be avoided in applying lift directly to frame bolster of car.*

## It's lots easier with a **WEAVER Hi-Lift Jack**

**E**ASIER to lubricate springs, replace broken spring leaves and worn shackle bolts and attach shock absorbers—easier to elevate cars to a convenient height for inspection and repairs—easier to unload double deck shipments of cars—easier to transport truck wheels about the shop with the aid of the Truck Wheel Attachment (which can be secured at a nominal additional cost)—easier to handle countless other jobs that come into your shop every day.

The Hi-Lift Jack possesses an extreme range of lift of from 7 inches to 45 inches. It is simple in operation and ruggedly constructed to handle burdens up to 3,000 lbs. The worm gear construction of the lifting arm makes it impossible for the load to be accidentally released.

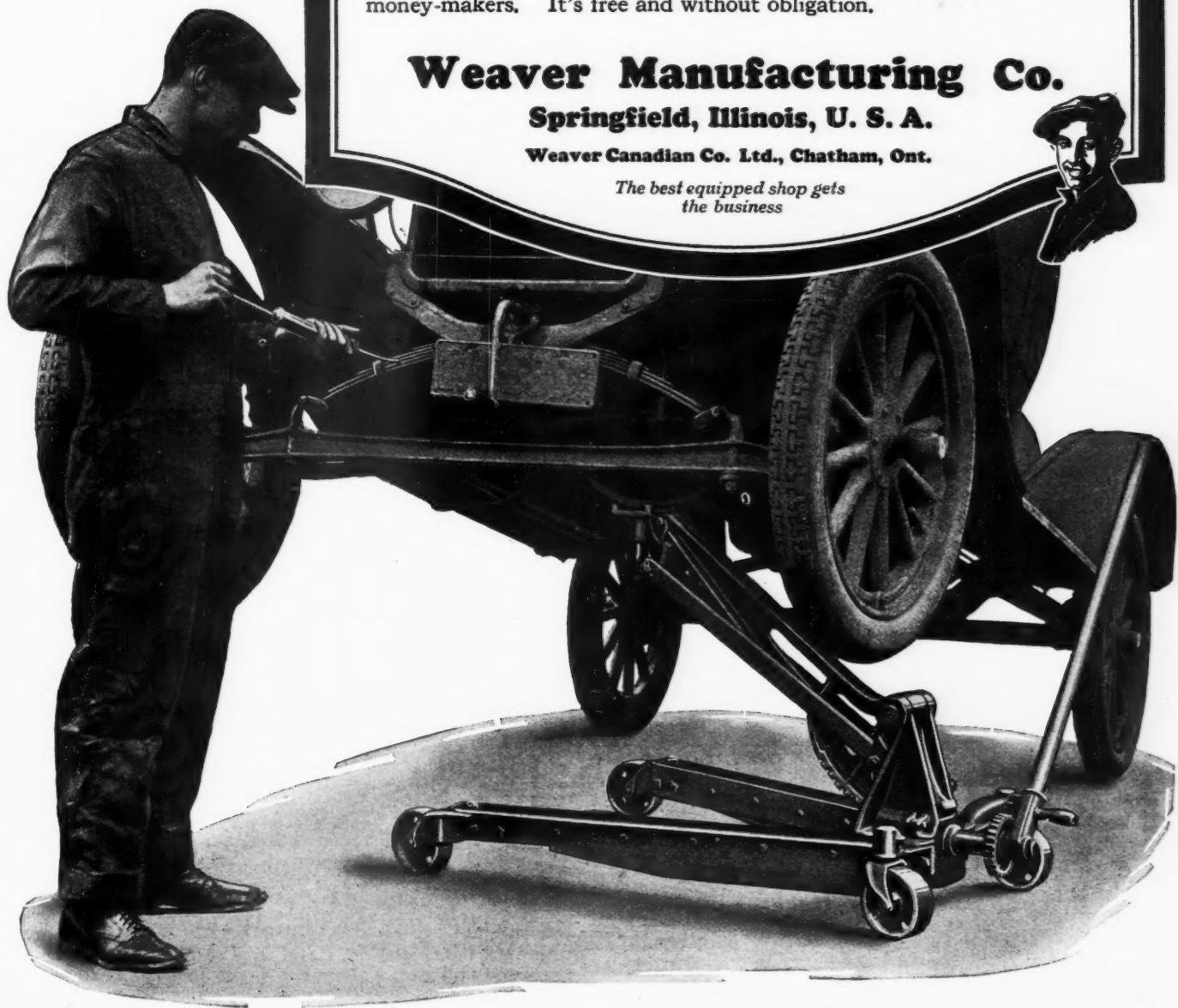
If you are interested in making more money on repair work this season, write for catalog describing this and thirty other Weaver money-makers. It's free and without obligation.

**Weaver Manufacturing Co.**

**Springfield, Illinois, U. S. A.**

**Weaver Canadian Co. Ltd., Chatham, Ont.**

*The best equipped shop gets  
the business*



# SPOTLIGHT ADS BRING RESULTS!

1803 HILL STREET  
ANN ARBOR, MICHIGAN  
April 1st. 1924.

The Class Journal Co.  
Spotlight Department,  
New York City, N.Y.

Att:A.B.Gilbert,

Gentlemen:- Referring to my ad. runing in your spotlight department, I am pleased to state, it has been very satisfactory: Following the first issue, I received four inquiries on the fourth day, fifth day a long distance call, and an average of three inquiries per week since.

As yet I have not closed a deal, but have three very good prospects: If I do not close, it will not be thru failure of the "Spotlight Department" to furnish sufficient prospects.

I feel the results have been remarkable, since my advertisement was an undisplayed ad. costing only 6¢ per word.



FOR SALE

**TRUCK ASSEMBLING PLANT**  
Truck assembling plant complete; located on "Great Lakes Water Way," with water and rail shipping facilities. We will sell complete or in part, the plant, machinery, tools, jigs, dies, bolts, nuts, supplies, motors, transmissions, axles, wheels, rims, steering-gears, magneto-generators, pressed steel channels, lamps, headlights, and accessories. All standard units. L. Shay, Harbor Springs, Michigan

Closed up sale. New and rebuilt marine engines, marine gear, marine starters, marine motors, marine etc.

I feel the results have been remarkable, since my advertisement was an undisplayed ad. costing only 6¢ per word.

Yours for continued success,

*L. Shay*

The Spotlight advertisement referred to above costs 6¢ per word or only \$3.54 for one insertion.

JUST more evidence that Spotlight ads are seen—read—and acted upon!

Whether it's a complete plant including used machinery and equipment (such as was advertised here) or some particular machine you want to sell or buy, or a business opportunity of any kind—a Spotlight

ad will bring results, quickly, efficiently, and at little cost.

To find what you want—consult the Spotlight Department! To get what you want—advertise in the Spotlight Department!

For Spotlight rates in Motor Age, Motor World, Automotive Industries, Automobile Trade Journal, El Automovil Americano, Distribution & Warehousing, address the Class Journal Company, 5 So. Wabash Ave., Chicago, Ill.

# An Air Cleaner Is An Absolute Necessity

An air cleaner is just as essential as tires or any other item about the car that tends to improve its performance or comfort.

In fact, tires are a luxury, while an air cleaner is a necessity. Its first cost is the last. It prevents all the ills and costs of motor upkeep resulting from dirt and grit getting into the motor. AND THESE ARE MANY AND COSTLY.

Study the air cleaner problem. It is ripe and going to be a big thing.

**United Mfg. & Distributing Co.**  
9703 Cottage Grove Ave.,  
Chicago, U. S. A.



The United Air Cleaner separates the dirt and grit from the air—throws the dirt and grit AWAY—and allows only clean air to enter the engine.

It is a neat article—weighs only 18 ounces—is easily installed.

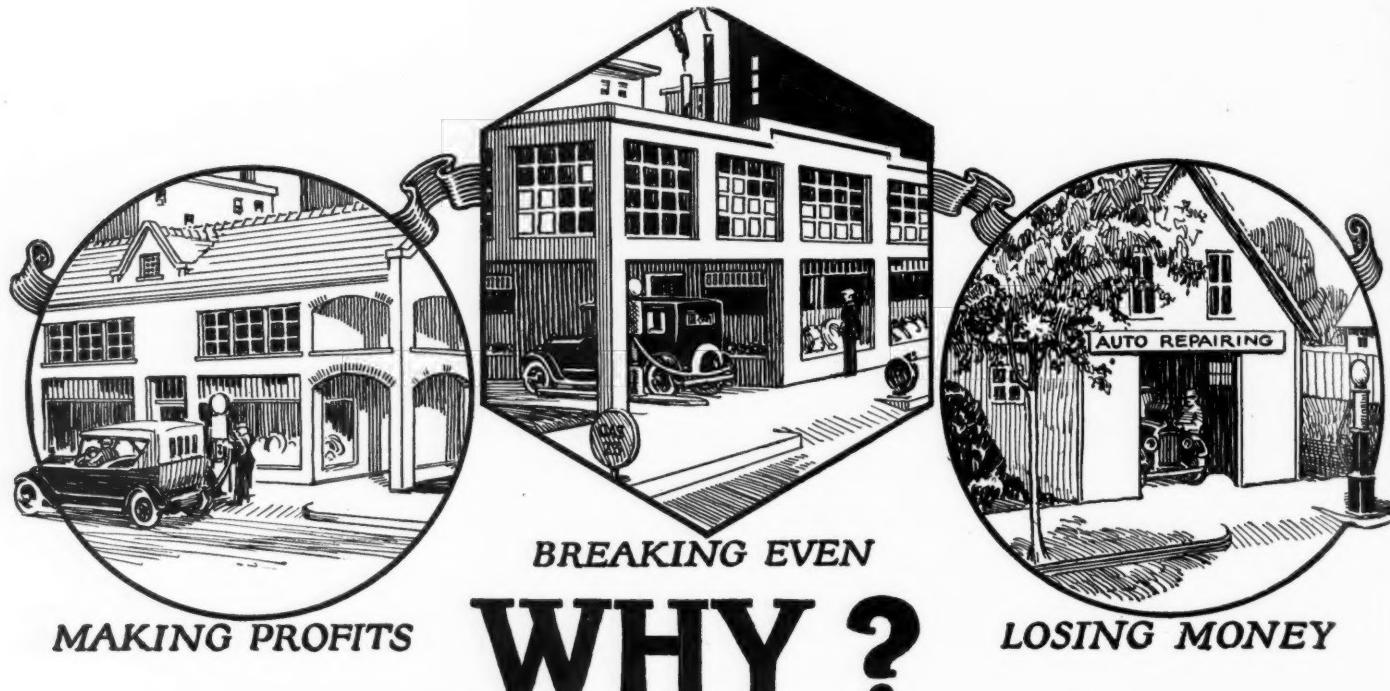
Once installed it requires absolutely no attention. It does not reduce engine power. All metal, it is fire-proof against backfires.

## *The* UNITED AIR CLEANER

*Dustless Air to the Motor*



*There's Grit in the Air!*



## HERE YOU WILL FIND THE REASONS

MOTOR AGE  
PUBLISHED WEEKLY  
CHICAGO

Vol. XLII, No. 10  
April 17, 1924

MOTOR AGE

**MOTOR AGE**  
5 SO. WABASH AVE.,  
CHICAGO, ILL.

**MOTOR AGE** has set for itself a definite mission. It is a business paper of the automotive trade and concerns itself with the greater success of those in this tremendous field. Among other important features, **MOTOR AGE** brings to its readers the fundamental reasons for success in the automotive trade. It tells why certain types of automotive merchants are successful and why others are not. It gets down to facts and specific reasons. It doesn't preach—it advises. As an influential factor in the progress of the automotive trade, **MOTOR AGE** has as one of its policies the belief that all of us can profit by the experiences of others. In every issue are found many valuable thoughts that were aroused by some dealer's experience. Thousands of leading automotive dealers the world over are thus profiting by these weekly messages.

# BADGER TIRES

## Make Prosperous Dealers

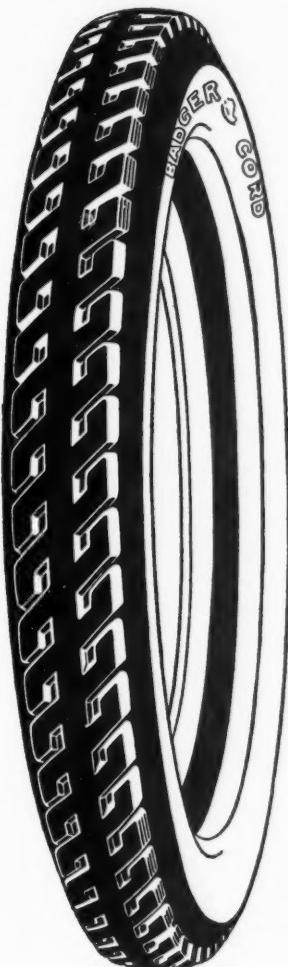
When Dealers take on the BADGER line of Tires, they enjoy a satisfactory and profitable business.

The high standard of quality of BADGER at once attracts the intelligent buyer and builds up a constantly-growing demand for the Dealer.

The BADGER line is complete in types and sizes, easily competitive, permanent of supply, and attractively profitable.

Leading Jobbers of the Country recognize this fact, and are pushing BADGER Tires through their Dealer trade with mutual benefit.

*Dealers supplied through accredited  
Jobbing Houses. If not obtainable,  
write—*



## THE BADGER RUBBER WORKS

MILWAUKEE, WISCONSIN

**The SPOTLIGHT**  
DEPARTMENT  
WILL FIND WHAT YOU WANT



**6¢  
a word**

For inexpensive, quick-acting, result-producing publicity use Spotlight Service—it is a good doctor for any business want.

**6¢  
a word**

Some other reader wants to buy what you want to sell—let Spotlight Service find him for you.

**6¢  
a word**

Spotlight ads can be bought today at prices everyone can afford to pay.

**6¢ a word**

Have you anything to sell—used machinery, spare parts, surplus stock of any kind. Let Spotlight Service find you a buyer.

**6¢  
a word**

The live men of the industry read their business paper—you can reach them through Spotlight Service.

**6¢ a word**

Nature dislikes junk piles. If you have any "junk" in your plant let Spotlight Service turn it into cash.

**6¢  
a word**

Spotlight advertising  
is  
Opportunity advertising

**6¢  
a word**

Whether you want to buy or sell Spotlight Service can help you. These little ads work both ways.

**6¢  
a word**

To find men or employment, to locate business opportunities, to sell, rent, exchange or buy, Spotlight Service will help you.

**6¢  
a word**

EVERY DAY—EVERY HOUR—SOME ONE—SOMEWHERE—has a business want that could be satisfied quickly by someone else in the industry. Tell your troubles to the Spotlight Department and watch for the quick results.

**6¢  
a word**

You can find it,  
You can sell it  
Use a Spotlight ad  
to tell it

**6¢  
a word**

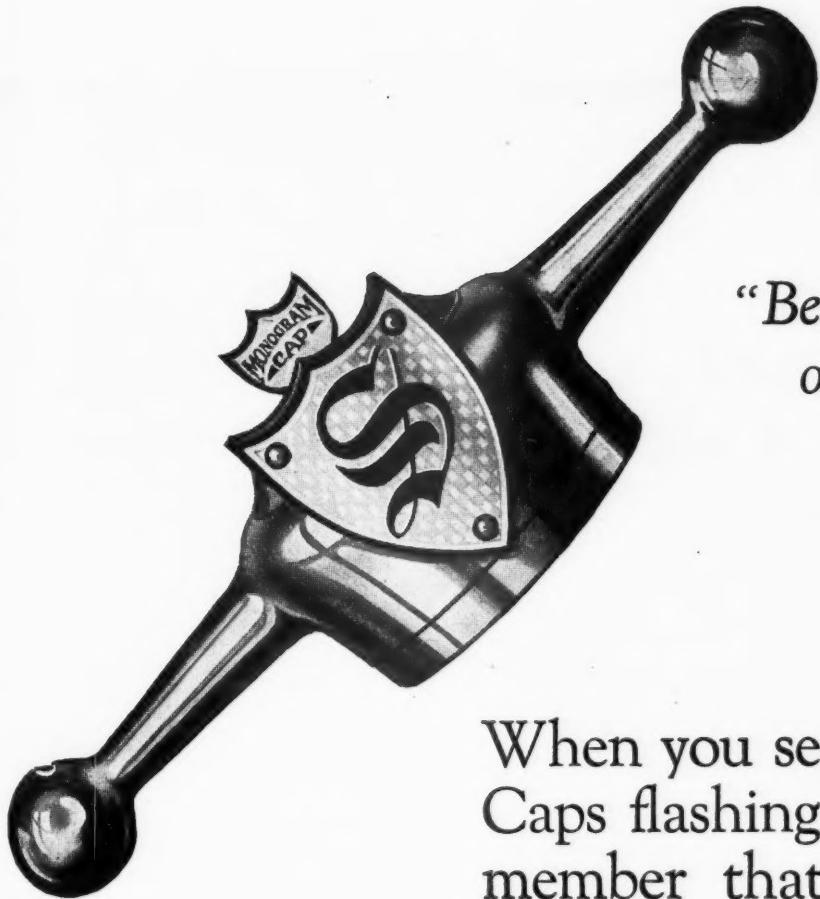
If you need good men in your business, if you are looking for a better position, if you want to buy or sell used machinery, Spotlight Service will help you.

**6¢  
a word**

Whether you want to buy or sell Spotlight ads will do it well

**6¢ a word**  
Let the  
**SPOTLIGHT**  
find it for you

**The Spotlight Department this week is on page 143**



*"Beauty  
on Duty"*

When you see the **MONOGRAM** Caps flashing by in traffic, remember that beauty, protection and utility have sold **MONOGRAM** to millions.

When you see cars **WITHOUT** **MONOGRAM** Caps, remember that beauty, protection, utility

**AND YOU**  
can readily sell millions more

**MONOGRAM**  
**ORIGINAL**  
**SELF LOCKING RADIATOR CAP**

GENERAL AUTOMOTIVE CORP., 600 W. Jackson Blvd., CHICAGO



## The Original Silent Timing Gears of Celeron

*There are numerous pronounced differences between D&B and the various substitutes and imitations on the market. Here is one of them.*

Engineers recently made exhaustive tests to qualify our statement that the average D&B Silent Timing Gear will distort less than one-thousandth of an inch when operated under load in hot oil at temperatures not even approximated in service.

At the same time and under the same conditions they tested other gears designed to do what "D&B" Gears actually accomplish.

### Genuine "D&B" Silent Timing Gears Do Not Distort in Service

While one of these other gears distorted in varying amounts from two-thousandths to more than seven, another being almost equally irregular in its action, the resulting diagrams showed that the Genuine "D&B" Silent Timing Gears distorted less than one-thousandth—maintaining an almost unwavering straight line throughout the entire test.

Distortion less than one-thousandth represents almost perfect performance, while distortion up to seven-thousandths entirely defeats the purpose for which the gears were designed.

Such freedom from distortion, found always in "D&B" Silent Timing Gears, is due to the absolute stabilization of "D&B" material before it is cut—by a special process not applied by other makers of Timing Gears.

Therefore, if you want to give your customers a Silent Timing Gear Train that will not distort from any cause—

*Insist on getting the original Genuine "D&B" Silent Timing Gears*

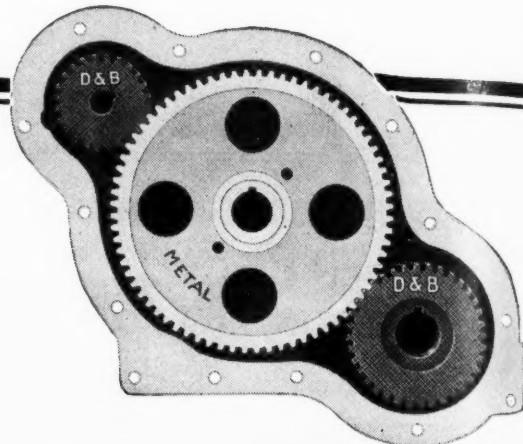


2333 Michigan Blvd.

Incorporated

Members of American Gear Manufacturers Association  
New York Branch: 157 W. 51st St.

Chicago, Ill.



*Showing the approved method of installation for composition gears as developed by Dalton & Balch, Inc., and accepted as standard by a majority of the best automotive engineers.*



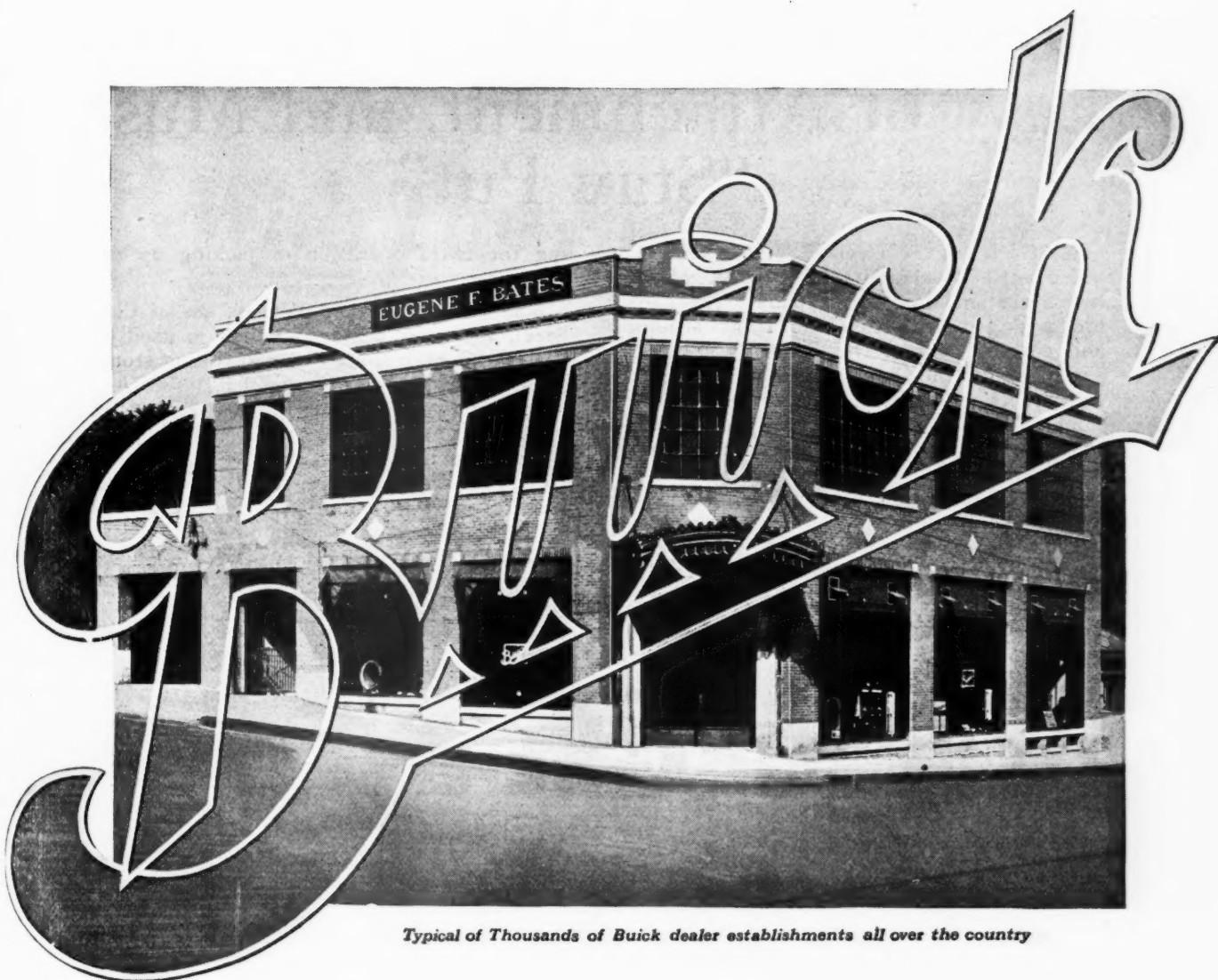
### Yours for the asking

This Silent Timing Gear Manual is valuable to Service Stations. It covers such practical features as "How to Balance a Timing Gear Train," etc.

### The Silent Timing Gear Manual

Illustrates the various types of Timing Gear Trains now in use and gives Timing Gear Specifications for all passenger cars, trucks and motors.

*Send for your copy today*



IN 1923 Buick sold 218,286 motor cars for which the public paid \$302,572,950 not including war tax or freight. Buick dealers had their share in this achievement. Why not have your name on file?

**BUICK MOTOR COMPANY, FLINT, MICHIGAN**  
*Division of General Motors Corporation*

Pioneer Builders of Valve-in-Head Motor Cars

Branches in All Principal Cities—Dealers Everywhere

**WHEN BETTER AUTOMOBILES ARE BUILT, BUICK WILL BUILD THEM**

# A Towing-Truck Must Be Strong, Easy of Attachment, and Must "Stay Put"

**MANLEY TOWING TRUCKS** are provided with attachment chains, the ends of which are anchored to the pads. The pads are arranged with lips and rings around and through which the chain is secured. There is sufficient length of chain to secure to the springs of the car to be towed (both sides), making it absolutely impossible for the towing truck to shift its position and get "off center." These chains insure quick and easy attachment, no tools being required, they make a rigid attachment of towing truck to car axle, and once "put," they "stay put" until you release them.

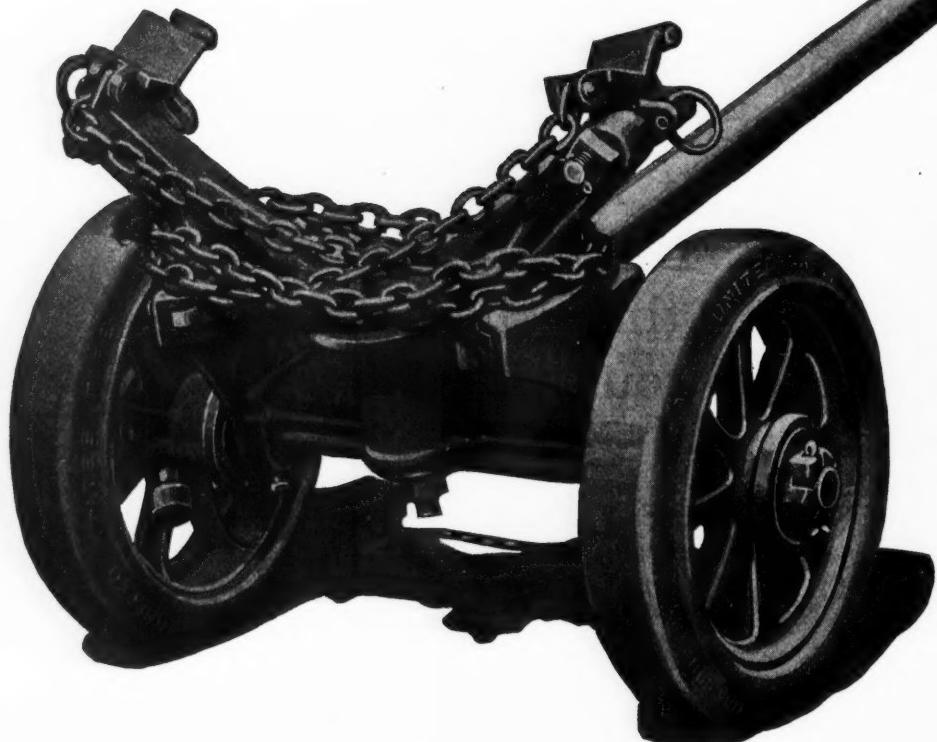
Manley Towing Trucks have been designed with minimum height and in many cases act as their own "fulcrum jack," sav-

ing the extra operation of jacking up the car to be towed.

The Post, Yoke and Wheels are of Cast Steel, the same material which is used so largely for high speed railroad rolling stock. Wheels run on 4 inch roller bearings. Axles are of tool steel, with wheels secured by castellated nuts and cotters. Yoke is deep I-Beam section. The massive pole telescopes, giving an adjustment from seven feet to twelve feet in length, and is clamped to the body to prevent wobbling. The best engineering principles have been applied to carry the load, and, the same as in the well known Manley Wrecking Cranes, Presses, Jacks, etc., the Towing Trucks have strength away beyond their rated capacities.

THESE ARE ALL MIGHTY GOOD REASONS WHY YOU SHOULD—

**Get a  
Manley**



Made in two Models—  
Model A has double post supported directly on wheel bearings. Model B can be supplied with double post, or offset single post. Prices range from \$40 to \$89.

Carried in stock by the best jobbers. For illustrated descriptive bulletin write to

**Manley  
Mfg. Co.**

York, Pa.

# The Perfect Snubbing Device With The Steel Cable



## The Steel Cable Never Stretches — Never Breaks

The tensile strength of the Burd-Gilman steel cable is 5320 pounds (over 2½ tons.) This tremendous strength is obtained by the union of seven individual cables combined in one; one cable being used as a core around which the remaining six are wound. Each cable is composed of 19 strands of rust-proof steel wire. Each individual strand has a tensile strength of 40 pounds to 45 pounds—a total minimum strength for the 133 strands of 5320 pounds.

**Write  
for Attractive  
Dealers'  
Discounts**

The Burd-Gilman Shock Absorber is a scientific instrument designed to control the action of automobile springs. It is not an experiment or a new, untried idea, but has proved its superiority by over three years of the hardest service in actual use on the roughest roads—under conditions which have tested its strength and efficiency in every way.

Burd-Gilman Shock Absorbers automatically meet every requirement of road, speed, and load. They prevent breaking of axles, springs, steering gears, etc. They not only insure greater riding comfort, but prolong the life of the car.

# BURD GILMAN SHOCK ABSORBER

## One Type and Size of Fittings for 97% of all Cars

No other snubbing device has a steel cable. The Burd-Gilman Steel Cable, used as a connection between the car frame and the axle, is strong, flexible, rustless, and has many outstanding advantages over the conventional webbing employed on other snubbing devices.

It will not break, fray or stretch and is not affected by heat or cold, rain or mud. It does not harden, crack or kink in cold weather. It has no "filling" to gum or work out when subjected to summer heat.

The Burd-Gilman is very simple in construction. There are but two moving parts. After installation no further attention is necessary. No oiling or greasing. The one bearing that revolves on the shaft is self lubricating. There is nothing to break, squeak, rattle or make a noise. If properly installed the Burd-Gilman Shock Absorber need never be looked at again because it operates automatically. It is trouble proof.

Model F (for Fords) set of 2 - \$17.50  
Model C (for all other cars) set of 4, \$35.00

**BURD HIGH COMPRESSION RING CO., Rockford, Ill., U. S. A.**  
"Makers of the famous Burd Piston Rings"



*Our Special  
Trial Offer*

Write today for complete details of our Special Trial Offer for garage and service station owners.

## SWIVEL JOINT AND SHAFT CO.

Plymouth

## THE O. K. SHOP LAMP

Indiana

::

# Spot-light the work!

THE O. K. SHOP LAMP puts light right where you want it—on the work. No more getting in your own light no matter what part of the car you are working on, or even if you are under it.

The sturdy construction of the O. K. SHOP LAMP with its patented flexible arm gives it the ability to withstand hard usage. Works in any position. Low in cost, lasts a lifetime.



SHOULD BE USED FOR  
Gasket sealing  
Battery terminals  
Springs  
Manifold paint  
Spark-plug threads  
Hose connections  
Door squeaks  
Steering knuckles  
etc., etc.

## Service Stations & Battery Men— *Put This Paste At Work*

It is well worth while to make sure that there is no leak in the cylinder head—so when you put it on—use KEY GRAPHITE PASTE on the gasket and you will have a 100% seal.

Also — clean battery terminals thoroughly and put on KEY GRAPHITE PASTE and prevent corrosion.



Distributors being added—Dealers write direct if your jobber doesn't stock.

-----*Sample—FREE*-----

Key Boiler Equipment Co.,  
27th and McCasland Ave.,  
East St. Louis, Ill.

Please send me without charge or obligation a sample of Key Graphite Paste.

Name.....

Address.....

Business.....

MA 4-17

These and a host of other vital spots require the reliability of KEY.

**Key Boiler Equipment Co., Inc.**

27th and McCasland Ave.

East St. Louis, Illinois



# DURABILITY

Hyatt New Series Bearings possess to an even greater degree that durability which is so typically Hyatt.

Greater roller contact and increased cage strength assure that longer bearing life, closer alignment and increased ability for withstanding shock which is so essential in today's automotive vehicles.

As in all Hyatt Bearings the self-cleaning and self-lubricating

features, so distinctively Hyatt, are retained in the New Series Bearings.

Installed with these inherent safety factors—requiring no adjustment and the minimum of attention to lubrication—Hyatt New Series Bearings will give the motorist that durability in operation which eliminates bearing worries at the vital points where Hyatt Bearings are found.

#### HYATT ROLLER BEARING COMPANY

Newark Detroit Chicago San Francisco

Worcester	Milwaukee	Huntington, W. Va.	Minneapolis	Philadelphia
Cleveland	Pittsburgh	Buffalo	Indianapolis	

*The  
New Series*

**HYATT**  
*Quiet*  
**Roller Bearings**

# WAYNE

## Cylinder Reboring Machine



## Rebored— and going on high

A salesman covering his territory in a car had cause to stop to have two cylinders rebored and refitted. The garageman was equipped with a Wayne Cylinder Reboring Machine and gave prompt service. The salesman made his local calls on foot and returned in four hours to find his car ready. From another state he writes—"was almost arrested several times for speeding. The old bus had so much pep I couldn't resist stepping on the gas. She's running smooth as oil and seems to have unlimited power on hills."

That's the kind of service you can give if you are equipped with a Wayne. It handles 95% of cylinder reboring jobs without removing the blocks from chassis. Operates by hand, small motor or electric drill.

With a Wayne you can give accurate reboring estimates. We can furnish scores of testimonial letters from garagemen saying the Wayne is an excellent profit maker that pays for its installation quickly.

Write for full particulars today.

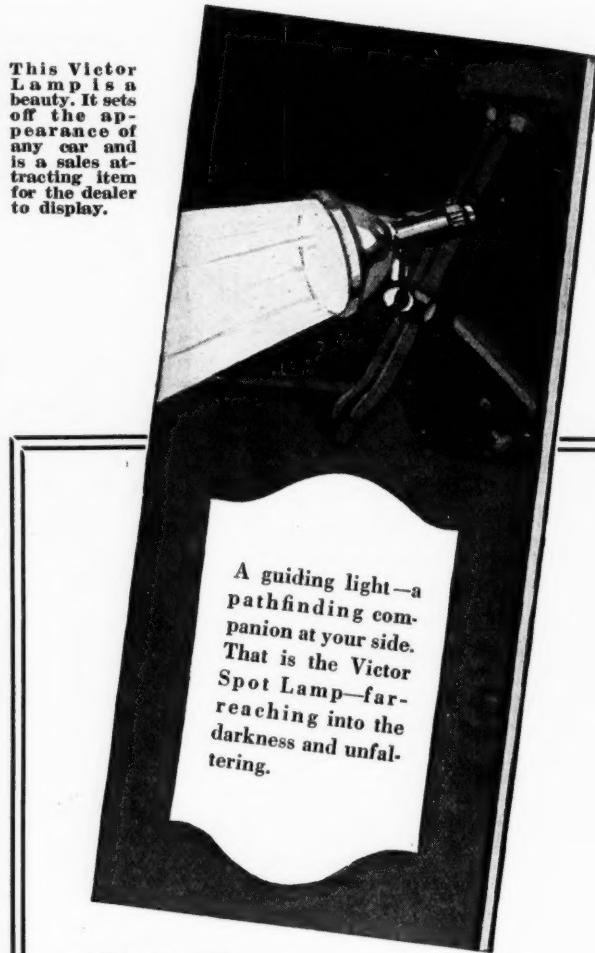
**The Wayne  
Tool Mfg. Co.**

Waynesboro, Pa.



Direct application  
to cylinder block.  
Packed in oak  
case with complete  
instructions.

This Victor Lamp is a beauty. It sets off the appearance of any car and is a sales attracting item for the dealer to display.



A guiding light—a pathfinding companion at your side. That is the Victor Spot Lamp—far-reaching into the darkness and unfaltering.

## Nightime Is Lightime

The motor car equipped with a Victor No. 100 Spot Light places in the hands of the driver a beam of daylight that is his to command.

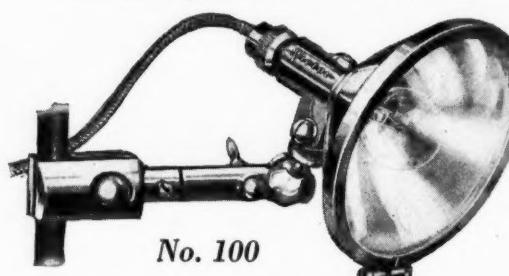
It can be swung into any position except into the eyes of an approaching driver. When focused, it stays put and will not jar out of position.

It is of double shell construction, entirely of brass and cannot rust. Ordinary dents will not mar the reflector. It is equipped with a self-contained on-and-off type switch.

It is made and finished like a piece of jewelry in hard baked black enamel or all nickel. Furnished complete with cable and adjustable bracket, ready to install. Specify No. 103 for closed cars.

Our catalog gives full details on these lamps and the full Victor Quality Line.

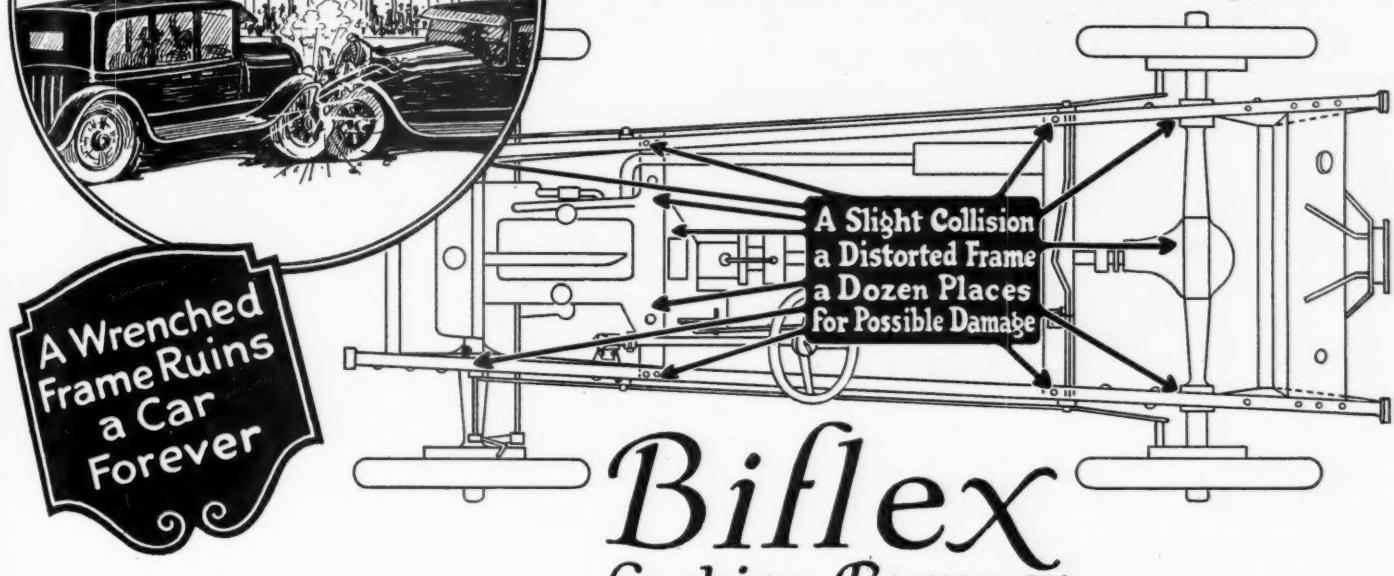
**The Cincinnati Victor Co.**  
714 Reading Road, Cincinnati, Ohio



No. 100

**Victor** TRADE MARK **Spot Lamp**

# A Big Point Many Well-Meaning Dealers Overlook-



## Biflex Cushion Bumper

### Protects Dealers Against Costly Service Troubles

Ask the insurance adjustor. Ask the repair mechanic. Both will tell you that the need of protection for an automobile goes far beyond the protection of radiator, lamps and fenders. Their experience with collisions has shown the need of protection in its broader aspect—protection against angular blows that distort the frame and twist the mechanism out of alignment. These are the blows, often slight impacts, that do irreparable damage to a motor car.

A frame jolt may wrench the motor from its fastenings or effect a misplacement. It may twist the clutch, and disalign gearing and bearings. The shock may carry through the drive shaft to differential and rear axle and cause disalignment there, with its resultant noise and necessity for repairs. Damage of this character cannot usually be successfully repaired. **A wrenched frame ruins a car forever.** When this happens, continuous complaints from the customer

are sure to follow—and finally comes his decision to buy another make of car, resulting in your permanent loss of a customer. All because he was sold a cheap bumper. **Don't make this costly mistake.**

The Biflex Bumper was designed and built to give adequate protection against powerful thrusts from any angle. Its great up-and-down surface intercepts all blows. Its full-looped ends provide cushioning qualities that enable it to absorb terrific shocks and prevent their transmission to the car. Here is real bumper protection—and every motor car can have it. Special brackets—strong, rigidly fastened, rattle-proof—for every car.

Sell the Biflex, and you will sell not a half measure of protection, but a distinctive bumper that provides protection in the fullest meaning of the term.

Write today for the Biflex proposition.

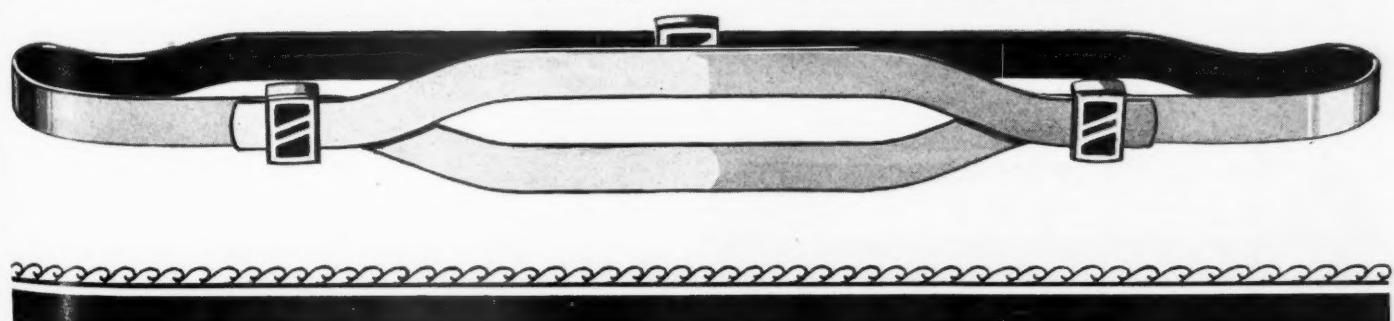


Trade Mark

### THE BIFLEX CORPORATION

Export Department: 130 West 42nd St., New York City

Waukegan, Illinois





## "I Could Buy an Autowline for Half the Cost!"

Sure you can; for \$4.95 you can buy the *original* wire rope towline, and absolutely safeguard against emergencies. Light, compact, dependable, it's tow-home insurance at no more cost than a box of cigars!

One car-owner writes: "I have carried a Basline Autowline in five different cars, and have demonstrated it to many a traveler. It's sure *there* 'when a feller needs a friend.'"

But don't accept substitutes—there are many imitators—be sure you get Basline Autowline, made of world-famous Yellow Strand Wire Rope. Can be tucked under a seat cushion. Snaps on instantly with patented Snaffle Hooks that cannot loosen. Now \$4.95, east of Rockies.

### MONEY FOR JOBBERS AND DEALERS:

Basline Autowline pays you a good profit, it sells well, and is the *only* Nationally-Advertised towline on the market. Push it this season.

**BRODERICK & BASCOM ROPE CO.**  
ST. LOUIS—NEW YORK



## It Pays to Buy a Kellogg

Model E.M.-62



## No Hot Air—

about this. The E. M. 62 compressor is the one you want if you've got a big place.

The E. M. 62 compressor is built for big garages and big filling stations.

You can depend on it *all* the time.

We can prove it.

Send us a card.



New Kellogg  
Air Tower

Attracts Motorists night and day. Air and water service combined. Price only \$60.00.

**Kellogg Mfg. Co.**  
Rochester, N. Y., U. S. A.

NEW YORK 112 West 42nd St. CHICAGO 1502 Monadnock Bldg.

SAN FRANCISCO 1583 Bush St.

CLEVELAND 1108 Hippodrome Bldg. DETROIT 2113 Dime Bank Bldg.

DALLAS 2006½ Commerce St.

**Beyond Compare for Pumping Air**

# INSHIELD

TRADE MARK REGISTERED U.S. PAT. OFF.

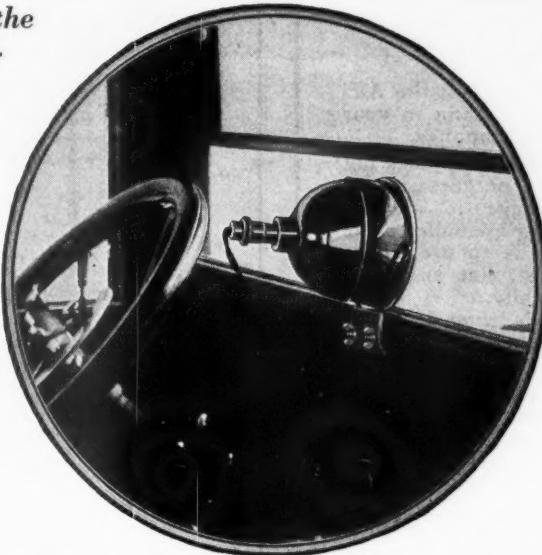
## DRIVING LIGHT

*We own and control the patents pertaining to design, construction and installation of the Inshield type of driving light.*

### INSHIELD SENIOR

Heavily nickelized.  $5\frac{1}{2}$  inches in diameter. A beautiful and powerful light for the big cars.

\$10.00



*Patented Nov. 8, 1921  
—Oct. 30, 1923. We will vigorously protect our patent rights.*

### INSHIELD "8"

In nickel, or baked on black enamel.  $4\frac{1}{2}$  inches in diameter. Fits any car.

\$7.50

## The Light That Safeguards The Motorist —And The WINDSHIELD

THE Inshield is the outstanding sensation of the accessory trade. It opens profit possibilities for jobber and dealer that were heretofore inaccessible. The Inshield line offers a driving light of superlative efficiency to any and every car.

The ease and speed with which it is attached, the splendid efficiency of its operation, the fact that the

windshield is not mutilated by installation or endangered by use of the Inshield gives it new and greater market possibilities than have heretofore been associated with such specialties. The Inshield is instantly available as a trouble lamp. It can be moved or removed without leaving unsightly marks. Every Inshield is made of the very best materials obtainable. Sheet brass body, heavily nickelized or enameled, genuine silver reflectors, 21 candle power precision type, tipless mazda bulbs. Bulb or lens easily changed without tools.

*Genuine Inshields are made only by*

THE INSHIELD PRODUCTS COMPANY

DEPT. 8, TOLEDO, OHIO

**INSIDE THE WINDSHIELD—NO GLASS TO CUT—NO SPECIAL TOOLS**



# Air-O-Meter

## The gauge is on the Tower

Free Air brings them — the Air-O-Meter keeps them coming

Once a motorist has used the Air-O-Meter he keeps coming to your station for air and supplies.

With the Air-O-Meter he does not fuss with a gauge or guess at the amount. The gauge is on the tower. By turning a handle to the pressure the tire is to use, air is delivered to that point and then stops automatically. A light flashes as the air is being delivered and goes out when the desired pressure has been reached.

The Air-O-Meter is made in various styles and sizes to fill every modern requirement. The towers are sturdily constructed and of imposing appearance.

**and now equipped with Balloon Tire Pressures ranging from 15 lbs. to 100 lbs.**



Style A—

The master of all devices for air inflation. Stands 13 ft. high with 13 ft. of extra heavy 3-ply rubber hose, "kant leak" connections that justify their name and the very best air chuck obtainable. The spring tower allows hose suspension of 18 ft. on each side of meter, which is sufficiently high to reach the four wheels of the largest limousine. Extra heavy paintings with varnish finish. Any color. With water connection and with patent lever faucet, if desired.

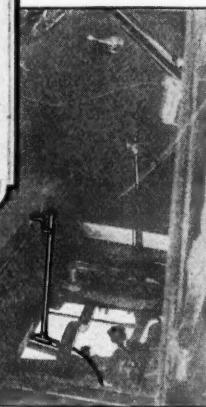
*"They'll Drive a Mile to a Meter."*

The Mattman & Sinclair Co.,  
Cincinnati, Ohio

# Air-O-Meter



**Quick, clean, accurate gas and oil readings for the Ford Owner**



Installed by notching or drilling floor, clamping bracket to seat and fitting tee to gas pipe.

**B RUNNER Gas and Oil Gauges end all fuss, muss and guesswork. They spare the Ford owner the trouble of removing the seat, poking in the tank with a stick or in kneeling down to open oily pet cocks to guess at his oil.**

The Brunner Gas Gauge is simple, sturdy, compact and good looking. It is placed handy at the center of seat where the Driver can reach it with his right hand.

The gauge is connected to the gas feed pipe and the same level is maintained in the tube as in the tank—through force of gravity. The blue-steel measuring rod shows exactly the number of gallons in the tank at any time. The driver simply unscrews the rod and reads the gauge.

Installed in 15 minutes. Types to fit any Ford. Gauge is nickel plated, highly polished. List price \$3.00.

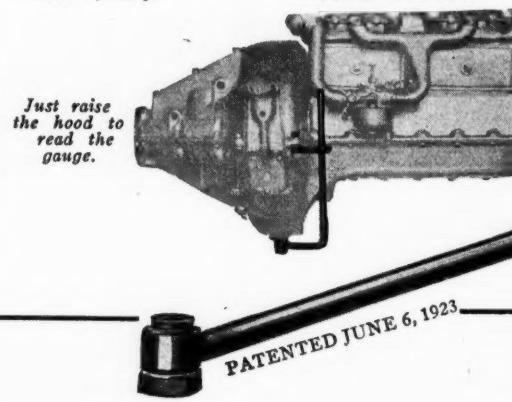
**THE BRUNNER OIL GAUGE** consists of a Japanned oil tube, steel measuring rod, accurately graduated by quart levels, a bracket and bolt to fasten to transmission case, and special brass oil plug with copper gaskets.

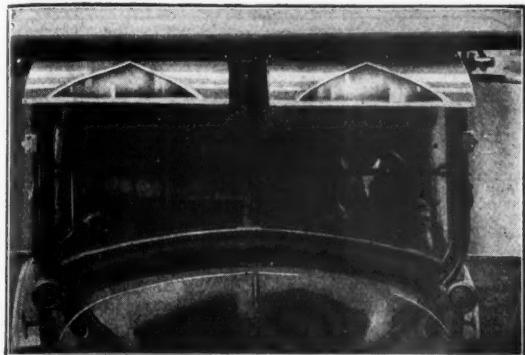
To read the gauge the Ford owner simply lifts the hood and draws out the measuring rod.

List price—\$3.00.

Specialty Agents, Jobbers: Write for Sales Proposition.

FEDERAL ENGINEERING CO.,  
Newark, N. J. 746 S. 12th Street





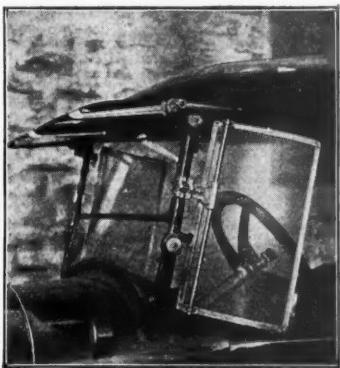
## No other visor has this feature

Adjusted instantly from inside the car by the driver from his seat.

A slight push or pull with the left hand raises or lowers Eclipse Safety Driving Shade (visor) to any desired angle—immediately eliminates Head Light Glare.

All metal construction with transparent "window" in each shade. The division in center of shade enables driver to see road or sidewalk to the right.

You stock only one size for all cars. Popularly priced at \$10.00. Big sales.



## Glass-Less Windshield Wings

A windshield wing of new transparent material that can't break—warp or crack or fade. A tremendous improvement over glass. Instantly adjustable from the inside without unfastening a nut or bolt.

Fit any windshield post and cannot work loose under any condition. Every adjustment angle is provided.

Furnished in clear white or amber. Eclipse Shades and Wings are two sellers you can't miss fire on. Both are high grade products and a necessity to any car.

Send in your order today. Get ready for spring profits.

**SUBURBAN TRANSIT CO.**  
PLAINFIELD NEW JERSEY  
Subsidiary of Spicer Mfg. Corporation

**ECLIPSE**  
*Safety Driving Shade Visor*  
*and*  
*GLASS-LESS Windshield Wings*



## BELL OVERTOPS THEM ALL

It brings to Fordowners all the precision and smoothness of high-priced ignition systems. It ensures easy starting, quiet running, and a wonderful flow of power.

## The BELL TIMER

"Built like a High-Grade Distributor"

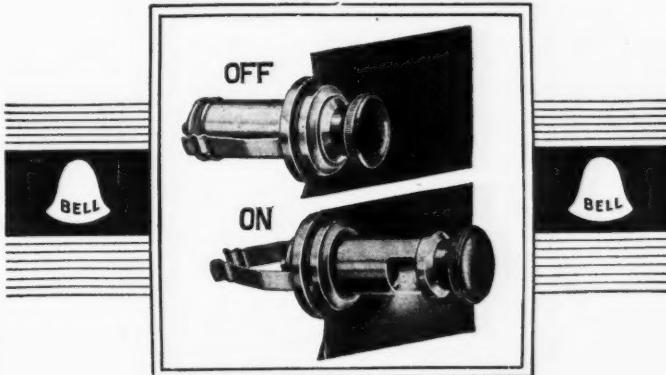
has a solid copper brush and contacts; unbreakable steel spring that takes up camshaft endplay and gives constant smooth pressure. Wipe contact over a raceway machined to glasslike smoothness. Bakelite shell. This timer cannot rust, pit, warp, or grow "lumpy."

*Ask your jobber why Bell Timers sell so well.*

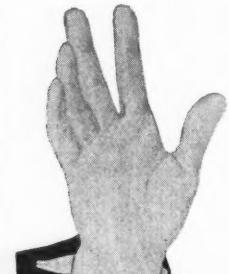
**BELL MANUFACTURING CO.**  
13 Elkins St. Boston 27, Mass.

Bell's new product is making a hit everywhere. Selling like wildfire!  
Ask your jobber to show you the unique

**BELL DASH LAMP**  
for Fords and other cars.  
The picture tells the story.



## CANTOL BLACK WAX WATERPROOFS BRAKE LININGS IN WET WEATHER



**STOP THOSE GRINDING SQUEAKING BRAKES**  
WITH  
CANTOL BLACK WAX  
Water-Proof  
FOR SALE HERE

When brake linings are treated with Cantol Black Wax, the weather will not make any difference in the breaking power. The bands are waterproof.

It will also stop brakes from grinding and squeaking.

The colored counter card illustrated here makes Cantol a quick 25c seller. Sent free to dealers ordering one dozen from any jobber.

### E. C. ATKINS & COMPANY INDIANAPOLIS, INDIANA

Established 1857

Fit Any  
Automobile  
Suit any Purse



## AUTO LAMPS

For haughty banker or humble flivervite, K-D AUTO LAMPS serve their purpose faithfully and well.

A lamp for every type of car with assurance of satisfactory profits every time you make a sale.

K-D AUTO LAMPS are unsurpassed for quick turnover and good profits and customer satisfaction. Prove it to yourself by a trial order.

A line brings catalog, prices and discounts.

### THE K-D LAMP CO., Cincinnati, O.

No. 600  
Driving Lamp



Recently designed to harmonize with popular drum type Head Lamps.

This model, for use on open cars, can be installed on a slanting or straight cowl.

Body is drawn in one piece from suitable gauge metal; all plated parts are made from brass, highly polished and plated; will not rust or corrode.

Bulbs are 2 c. p., 6-8 volt, single circuit wiring system.

Finished either in all nickel or black enamel baked on, with nickel trimmings.



No. 18  
Drum Shape Side  
Lamp for  
Touring Cars

Drum type lamp, with special bracket, for attaching to frame of car, on fender, cross rods or cowls of car, and so wired that it lights when Head Lamps are dimmed. Can be thrown to side of road to pass approaching car in safety.

Construction is double shell type; outer body is drawn in one piece from suitable gauge metal; all plated parts made from brass, highly polished and finished.

Reflector is parabola shaped, made from brass, highly polished and plated.

Bulbs are 6-8 volt, 21 c. p., type "C," either double or single wiring system.

Finished in black and nickel only.

## The Most Useful Jack on the Market for



Garages  
Vulcanizers  
Tire and  
Accessory Stores

### The "Dickerson" Service Jack

For tire and wheel work, brake adjusting, spring and chassis repairs, there is no handier jack made. The "Dickerson" Service Jack handles all cars—pays for itself in time saved. Handles heavy cars easily and all cars quickly.

**SPECIFICATION**—Iron and steel throughout—4 inch wheels—steel gear—bronze worm, heavy ball thrust bearing—length 53 inches—low position 8 inches—post adjustment 4 inches—block adjustment 2½ inches—lift 5 inches—range 8 to 19½ inches—weight 50 pounds—capacity 6000 pounds. Price \$18.00.

Write for catalog of complete line.

### DICKERSON

Garage Jacks  
Air Compressors  
Shop Equipment

Made by  
C. A. Dickerson  
Compressor  
Corp.  
Buffalo, N. Y.



## They Come for Oil— They Come Back for Service

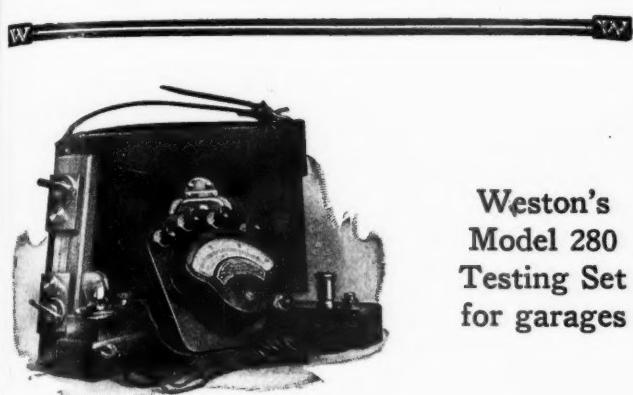
Quick service is vital in the garage and filling station trade today. That's why the Brookins Measure is being adopted as standard equipment everywhere. The long, flexible, metal nozzle of the Brookins Measure reaches the most inaccessible of oil intakes—no funnel is required. The oil flow is controlled by a valve operated from the top of the measure—when closed this valve does not leak. The experience of others shows that it will outlast a dozen ordinary measures and funnels.

The Brookins Measure is all copper finish. If your jobbers cannot supply you, write us immediately for samples and prices.

One-quart, two-quart, and gallon sizes, five-quart for Franklin Service.

The Brookins Manufacturing Co.  
319 Bayard St. Dayton, Ohio

**Brookins**  
OIL MEASURE



Weston's  
Model 280  
Testing Set  
for garages

## *There is good business in selling testing service—*

Give a customer good testing service and he at once becomes a probable buyer of accessories and service. With this set, you are prepared to make any electrical test.

Really a miniature precision voltammeter having six ranges, 30 and 3 volts—100 milli-volts—and 300, 30 and 3 amperes. Locates, shorts, grounds, open circuits in starting motor, generator wiring or auxiliaries. Gives rate of battery charge. Tests condition of batteries. Locates defective plates. Measures current required for starting motor, lights, etc. Cadmium test cables also supplied, if desired. Booklet H gives the details. Send on request.

**No. 441** "Fault Finder" for utility use and general testing.

**No. 443** Battery Voltmeter for testing individual cells of battery.

**No. 453** Battery Tester for heavy discharge battery testing.

With Weston testing instruments, you can render the highest standard of service to customers. Complete information on request.

**Weston Electrical Instrument Co.**  
10 Weston Ave., Newark, N. J.

**WESTON**  
Electrical Indicating Instrument Authorities Since 1888  
STANDARD-The World Over

**You can't beat a leather fan belt**

YOU can't compete with nature in the making of belts. Nothing has ever been made, or ever will be made to give the service—the long wear, the grip and pull—of honest leather. And drivers are realizing this now as they never have before. They want *leather* fan belts—Graton & Knight fan belts. The display case above is to help you tell the world that you have what it wants. In orderly array, well displayed, is fan belting that you can talk about and that will back up in service what you say about them. The famous Graton & Knight Link "V" belt in the display case is one of the fastest sellers, and one of the most profitable ones, you ever handled. Of wonderful strength, easy to make endless, noiseless in operation, almost indestructible—the Link "V" has friends everywhere. Ask your jobber about the Graton & Knight display case. Get yours now.

**GRATON & KNIGHT**  
WORCESTER, MASS.

*Nothing takes the place of Leather*



## Moves Quickly

You don't have to dust off your Arrow Grip Jack stock. It's not with you long enough. Display it and you'll sell it.

### ARROW GRIP JACK

The worm and nut controlled jack that raises or lowers the car by a few turns of long extension handle. Easily placed in position. Full handle controlled. Cannot slip. Topple proof. You don't get dirty with an Arrow Grip Jack.

*Ask Your Jobber or Write for Literature*

#### ARROW GRIP MFG. CO., INC.

106-126 Cooper St.  
Glens Falls, N. Y.

Export Office: 280 Broadway, N. Y.



Getting first hand experience in taking Cadmium readings and tearing down batteries to rebuild

### These Men

#### Will be worth their pay as experts

For, under the direction of highly skilled authorities, they are mastering Automotive Electricity, including ignition, starting, lighting and batteries.

These ambitious men realized that there are so few Automotive Electrical Experts available that they command the highest wages in the industry.

#### You, too, can earn \$60.00 a week

As many of our graduates are doing; and it doesn't take long to finish the course, either. Personal instruction at the School, or complete home-study course. Our 32 page booklet "Automotive Electricity" may point the way to your great opportunity. It is sent free.

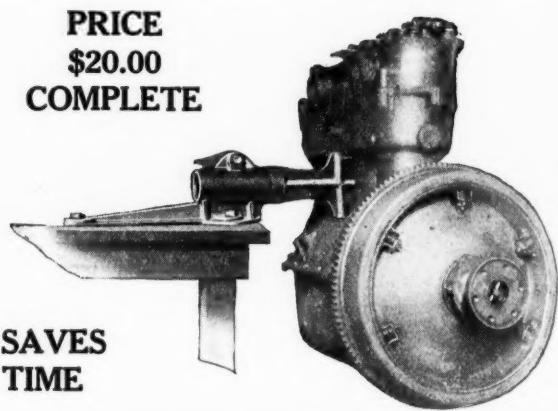
*Don't Delay—Write Now, Today*

#### SCHOOL of AUTOMOTIVE ELECTRICITY INC.

Dept. MA-4, 415 Marshall St.

Milwaukee, Wis.

PRICE  
\$20.00  
COMPLETE



SAVES  
TIME

#### FOR CHEVROLET SERVICE STATIONS

##### No. 6 Banner Motor Block Support

Overhauling jobs can be completed and head replaced before dropping back in chassis. Can be turned in any position. Will not press cylinders out of round. Makes engine work a one man job. WE ALSO MAKE THE O'BRIEN ENGINE SUPPORT FOR ALL DETACHABLE HEAD MOTORS as well as forty other accessories.—Manufacturers' Agents Wanted.

#### Banner Accessory Mfg. Co.

2629 La Salle St., St. Louis, Mo.

- ✓ Solid Bronze Backs - where bronze backs are used
- ✓ 100% Virgin Metal
- ✓ 10 Times Tested in inspection
- ✓ Clean, Solid Babbitt - no Blow Holes
- ✓ Machine Finished both before and after babbetting
- ✓ Not Over a Day Away



You are bound to get the right bearings—every time—if you order from our handy, nationally used 68-page bearing guide, which lists practically every make of car, truck and tractor with Milwaukee Bearing stock numbers for each. Not-over-a-day-away from your shop is one of our 550 distributors, with a complete stock of the Milwaukee connecting rod and crankshaft bearings in sizes most in demand in your territory. Write for his name and free copy of bearing guide.

Milwaukee Die Casting Co., Dept. F-4, Milwaukee, Wis.

#### MILWAUKEE BEARINGS

"Not Over  
a Day Away"



## Put it on the Showcase!

Put this Display Stand on your showcase and watch it attract attention—watch it make sales. The automobile clock that you have been looking for that is low in price, neat in appearance and dependable in service. It has been on the market about six months and over sixty-thousand have been sold. Its low price and its beauty sell it. Its accuracy and its durability keep it sold and help sell more. It is guaranteed for a period of one year. The MINUTE METER is a "Crumbs of Comfort" that no motorist with \$2.50 will go without. This remarkable clock fits on any dash, wood or steel, of any thickness. To remove for winding or setting, it is only necessary to turn the knob shown in cut, and lift clock out.

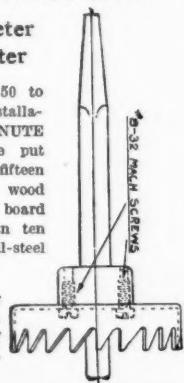
Neatly packed in individual cartons. Attractive display stand packed with each dozen. Twelve dozen to the case.

**The LUX CLOCK MANUFACTURING CO., INC.**  
Waterbury - Connecticut - U.S.A.

### Minute Meter Dash Cutter

You can add \$5.00 to the price for installation. The MINUTE METER can be put on in about fifteen minutes on a wood back instrument board and in less than ten minutes on all-steel boards.

Complete ready for use \$1.00. Pays for itself almost immediately.



## Almond "Straight Line" Chucks



Every User of Electric and Pneumatic Drills Should Familiarize Themselves With the

Van Dorn Chicago Pneumatic Standard Wodack Black & Decker (Heavy Duty Units) Cleveland Pneumatic  
Ingersoll-Rand Cincinnati Louisville Tameo Glow Petersen Keller

These Manufacturers in order to give utmost Chuck Service, equip "EXCLUSIVELY" with Almond "Straight Line" Drill Chucks.

Those who know say there are no better electric drills obtainable than those named above.

It is significant that the finest electric drills are equipped with Almond "Straight Line" Chucks.

T. R. Almond Mfg. Co., Ashburnham, Mass., U. S. A.  
Established 1873

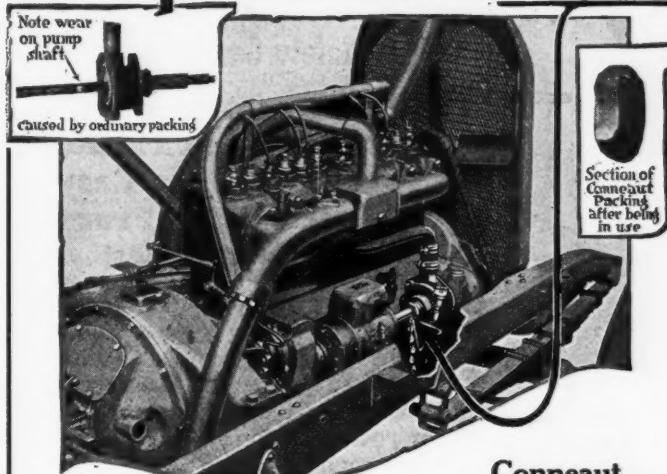
## Battery Plates made POROUS by Thousands of Explosions

HUNDREDS of dealers are using Pore-Blown Plates because they give the greatest capacity. Our new treatment causes one of the elements in the paste to actually blow itself out of the plate, leaving thousands of natural pores in its wake. Every battery man knows the value of natural porosity. Pore-Blown Plates are 100 per cent lead and lead oxides. They are long-life plates; will not chip out. Let us tell you about our service on plates and other battery parts.

General Storage Battery Co.  
2005 Locust St., St. Louis

## Pore-Blown Plates

## Stop That Leak



### Conneaut Packing

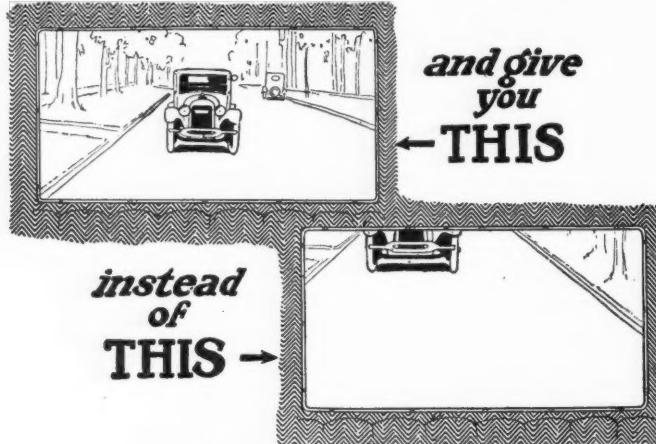
With Conneaut (a plastic metallic packing) a form to fit the shape of the stuffing box is quickly molded with the fingers. Its adaptability to form a perfect fit around worn shafts insures a permanent job.

Natural wear is taken care of by tightening the packing nut while the pump shaft is in motion.

See your jobber today. He, no doubt, has Conneaut in stock. If not, send us his name along with yours. You will both be furnished promptly.

The Conneaut Packing Co.  
Conneaut, Ohio

## KALES *Hindview* MIRRORS FIT THE CAR



*Full View Behind*  
*See Back as far as you see Ahead*

*Kales Brackets  
Do The Trick*

**Kales Stamping Company**

1673 W. Lafayette Blvd. Detroit, Mich.

**\$2 Profit for 30 minutes time  
with the Safety Center Reamer!**



The new sensation among garagemen! A big **quick** profit-maker! Reclaim front axles with this **Safety Center Reamer**. Every job means a satisfied customer and \$2 profit for you. Any one of your helpers can do the complete job in 30 minutes. When the front wheels "wobble", use the **Center Reamer** on the axle. Supply spindle bolts with a set of Lock Nuts and Washers. Makes front wheels true forever. Better than new axle. Profits for you—customer satisfaction.

### More Business—More Profits—Send Today!

More business and bigger profits for you. Makes more money on your helper's labor. Less than four repair jobs pays for complete set. Don't delay. Be the first in your community. **Center Reamer** complete with nuts and washers to equip six cars sent prepaid for only \$7.50. Extra washers and nuts at low price. Send today.

**Safety Manufacturing Co.**  
1812-14 Walnut St. Kansas City, Mo.

## To the Employment Manager

You want a man who will make good—someone whose record, past and present is evidence that he is ambitious, competent, efficient, progressive and up-to-the-minute.

He will naturally be a reader of his business paper, as otherwise he cannot fill all of the above requirements.

### Spotlight Service

can help you to locate a number of good men and from those you should be able to select just the one best fitted for your needs.

Six cents a word is all it costs for an undisplayed advertisement—but if you are in need of a man that is hard to locate a larger advertisement would doubtless prove a profitable investment.

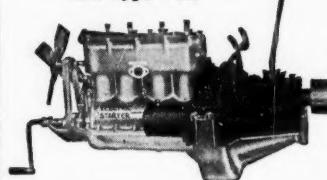
**6¢  
a word**

*Use your business paper  
to get business men*

## SIMPLEX replaces the regular Ford Transmission

### For More POWER

26 to 1 in low in our new type "CT"



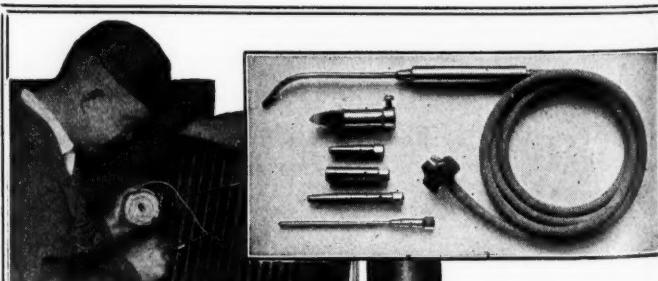
**"It will pull like everything"**

Three Speed Sliding Gear Type—for Ford Cars and Trucks

You have three speeds forward and one reverse, replacing the regular Ford transmission—drums, bands and all. The low speed is lower than the Ford, therefore, more power—the third is the same as the Ford and the second is half way between.

It's ruggedly built with over-size alloy steel gears. Multiple disc clutch. Foot break on jackshaft outside of case. Hyatt Roller and Genelite bearings. No cutting or machining—installation easy.

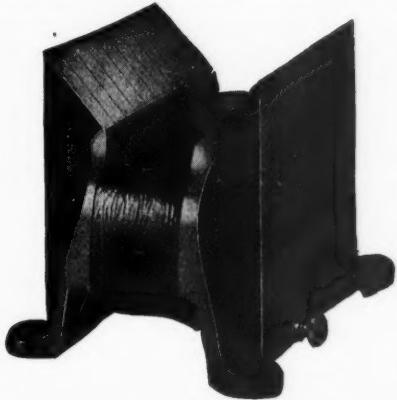
E. D. & A. F. CRONK, Inc., 140 Hotel St., Utica, N. Y.



### INSTANT HEAT FOR SOLDERING

TORIT TORCH OUTFIT NO. 13—The ideal outfit for quick soldering, radiator repairing, battery work, electrical soldering, light brazing, preheating, babbittting, etc. Ready the instant you need it—no waiting for soldering iron to heat. USES ACETYLENE ONLY. A splendid use for discarded auto acetylene tanks. Torch with 4 different tips; soldering copper, 5 ft tubing and connection for auto acetylene tank.

\$7.50  
St. Paul Welding & Mfg. Co., 169 W. 3rd St., St. Paul, Minn.



## This Growler Costs But \$4.50

With it you can tell in ten seconds whether an armature is in good condition. If it is not, you are saved all the grief of having to do the whole job over, losing all your profit and the customers' goodwill besides. Operates on 110 Volt A. C. Current.

Sold direct or through your jobber. Resale price \$4.50 in Central and Eastern States, \$5.00 in Pacific States. Your check for above amounts plus twenty-five cents postage brings this moneymaker to you.

**ARMATURES:** We rewind any and all kinds of GENERATOR, MOTOR and MAGNETO armatures, and reship same day old armatures received.

**FORD GENERATOR AND MOTOR ARMATURES**.....\$ 1.50

**ALL SMALL DOUBLE UNIT GENERATOR AND MOTOR**

**ARMATURES**.....\$ 5.00

**SINGLE UNIT MOTOR GENERATOR ARMATURES**.....\$ 10.00

**MAGNETO ARMATURES**.....\$ 3.75 to \$4.75

## Armature Rewinding Co., Inc.

3301 Washington Blvd., St. Louis, Mo.

## Did You Ever Study a Dreadnaught's Anchor?

Such a study would make self-evident to you the reasons why nothing can take the place of an anchor for the work it is asked to do.

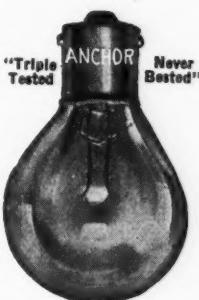
You would come away convinced of the anchor's:

- 1—**Indispensability** — The ship couldn't keep out of trouble without one.
- 2—**Indestructibility** — More durable than the dreadnaught itself.
- 3—**Uniformity**—the unvarying quality of the steel in it.
- 4—**Symmetry**—The beauty, economy and utility of its curves.
- 5—**Efficiency**—Capacity to do its work better than anything yet conceived.

It was not mere chance that made America's foremost independent automobile lamp manufacturers call their product the Anchor Auto Bulb.

The Anchor Ideal—Indispensability, Indestructibility, Uniformity, Symmetry and Efficiency—was etched in the original design.

Eight years of constant improvement have made the Anchor Bulb as durable, as beautiful and as reliable as the ship's talon after which it was named.



## Anchor Auto Bulbs "TRIPLE TESTED—NEVER BESTED"

Anchor Electric Co., 555 W. Jackson Blvd.  
CHICAGO

Originators of "Same Day Service" in the Auto Bulb Industry



## New Junior Assortment Cotter Pins

The only practical and profitable arrangement for quick, counter sales of Cotter Pins—and the best Cotter Pin Assortment for Garages and Repair Shops. The cases are very durable and covered with black leatherette, neatly marked—both lids strongly reinforced where hinged. When closed Cotters cannot be shaken out of their compartments.

We manufacture all sizes of Cotter Pins, Regular Assortments in screw top boxes and special assortments as specified.

ORDER FROM YOUR JOBBER

WESTERN WIRE PRODUCTS COMPANY  
ST. LOUIS, MO.

**TENAX**

There Is Only One Sheet To the Men Who Know **TENAX**

The greatest economy in sheet packing lies in its permanence.

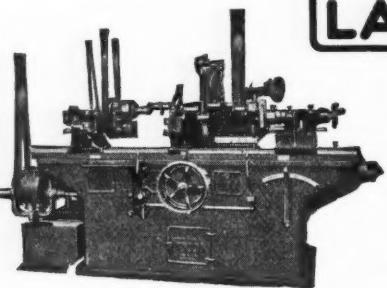
For twenty odd years Tenax Compressed Asbestos Sheet Packing has been the leading sheet, in constant demand by men who know packing. Recommended for the complete range of service in which a packing sheet will serve.

Made in thicknesses from 1/32 to 3/8 inch in blue, black or red—or 1/64 inch in black graphited only. Sheet size 50x50 inches.

Sold by leading jobbers—or prices and small sample sent direct to you upon request.

**Advance Packing & Supply Company**  
808 Washington Blvd., Chicago  
Pacific Coast Distributor: Allied Industries, Inc., San Francisco, Los Angeles, Seattle.

**TENAX**



**LANDIS**

The LANDIS 4-A Special GARAGE Grinding Machine is built ESPECIALLY for repair shop work. You don't need a manufacturing machine—don't get one. The 4-A Special is perfect for repair shops. Quick and easy change from job to job. Simple to operate. ACCURATE. Built by world's largest makers of grinding machines. More value for your money. Catalog.

**Landis Tool Co., Waynesboro, Pa.**  
New York Office—30 Church St.

DOUBLE YOUR FORD SELLING FIELD  
And Make Two Profits with

**Warford**  
AUXILIARY TRANSMISSION  
Two-Ton Capacity—High Speed  
Ask your nearest distributor to demonstrate it or write us.  
THE WARFORD CORP., 44 Whitehall Street, New York

## Meachem Gear Rings for Fly Wheels

Quality rings at lowest prices. Get our list.

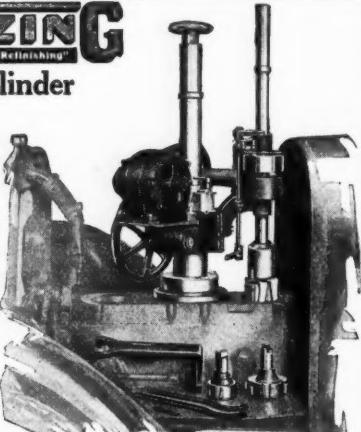
MEACHEM GEAR CORPORATION  
Syracuse, N. Y.

**STORMIZING**  
The Better Method of Cylinder Refinishing

Means More Cylinder Profits to You

The Stormizing process first produces a new "cannon-bore" true, perfectly aligned cylinder, and then gives a perfect "gun-barrel" finish. Stormizing Machines are automatic and self-centering. They renew and refinish all makes of cylinders. Made in three sizes: Portable (as illustrated); Semi-Portable, and Heavy Duty. Write for prices and your copy of our new book on modern cylinder finishing.

**STORM MFG. CO.**  
406-A Sixth Avenue South  
Minneapolis, Minn.



**REMINGTON AUXILIARY** *The Man Who Owns It Never Runs Out of Gas*

GASOLINE RESERVE FOR FORDS  
Ask Your Jobber or Write Us.  
REMINGTON AUTOMOTIVE CORPORATION  
17 West 60th St.  
New York, N. Y.

**NO-LEAK-O PISTON RINGS**  
Won't Leak Because They're Sealed With Oil

No-Leak-O Piston Rings are making money for dealers everywhere. Their "OILSEALING" groove found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing". National advertising is helping the dealer sell No-Leak-O. It will pay you to stock No-Leak-O at once.

Price 35c and up  
NO-LEAK-O PISTON RING CO., Dept. 376, Muskegon, Mich.

Write ~ and find out how

**WATSON STABILATORS**  
Change the Whole Nature of Your Car

JOHN WARREN WATSON CO., 24th & Locust Sts., PHILADELPHIA

## QUALITY—PROFIT—TURNOVER

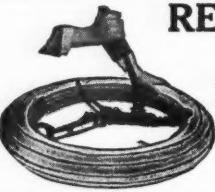
American Hammered Piston Rings

American Hammered Piston Ring Company  
Baltimore, Maryland

**RED GIANT RIM TOOL**

The name "RED GIANT" is a guarantee of satisfaction. Known and used in the majority of the civilized world. If your jobber cannot supply you write direct.

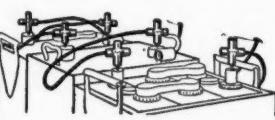
RED GIANT TOOL CORP.  
Lynchburg, Va.



**SHURO BATTERY CONNECTORS**

A tap with a hammer anchors them into battery terminal—like a nail in a block of wood. Positive metal-to-metal contact. Built to last for years.

BURTON-ROGERS CO.  
26 Brighton Ave., Boston



For your Business Want try the Spotlight Department

**6¢ a word.**

**SIOUX Carbon Removing Brush**

The quick, easy way to remove all carbon deposits, B66, heavy wire for rough surfaces; B67, fine wire for machined surfaces and aluminum pistons. Used with small electric drill or Sioux Flexible Shaft.

Ask Your Jobber  
ALBERTSON & CO. SIOUX CITY, IOWA

Let us send you our FREE Catalogue on

**Huetter's Fly-Wheel GearBands**

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546 Kentucky Ave. Indianapolis, Ind.

Write For Free Catalog No.31 Styles For All Cars

**Gemeo BUMPERS**  
Special Process Tempered Greater Cushioning Resiliency  
GEMCO MFG. CO.  
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# Get This "Pioneer" \$65 Garage Special

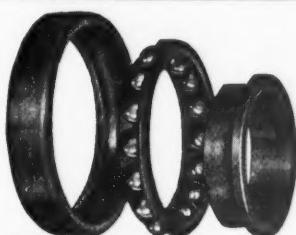
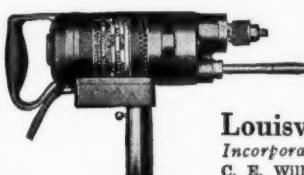
## Electric Drill

### and Valve Grinder

Greatest time and money saver, as well as money maker, for your shop—

*"It Will Do The Work"*

Louisville Electric Mfg. Co.  
Incorporated Louisville, Ky., U. S. A.  
C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.



Angular Contact Radial Bearings  
Angular Contact Thrust Bearings  
Thrust Ball Bearings  
"Star" Ball Retainers

The Bearings Company of America,  
Lancaster, Penna.

Western Sales Office,  
1012 Ford Bldg.,  
Detroit, Mich.

You get quality work, SAE specification materials, and the right price if you send your connecting rods to a Watkins plant for rebuilding and refuse imitations of



New bolts and nuts, laminated shims, new piston pin bushing are part of the rod rebuilding at no extra charge.

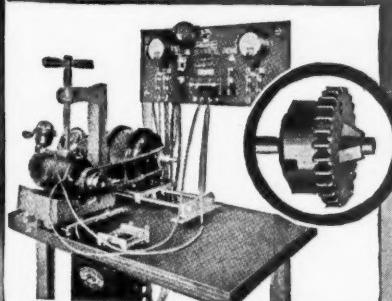
New Bearing tinned in the rod and broached to mirror finish fits quickly to crank-shaft and cuts time on flat rate repair jobs. Practice sending your rods in regularly. There's profit in it.

## WATKINS Complete REBABBITTING SERVICE

*"One Day Service from  
factory nearest you"*

Hartford, Conn., Ripley Motor Services  
Indianapolis, Ind., Indiana Watkins Mfg.  
Co.  
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## EXCELSIOR TEST BENCH With the Positive Drive and Speed Control



### INCREASE YOUR PROFITS!

Starting, lighting and ignition pays bigger profits than any other branch of automotive service.

**The Exelsior  
Test Bench**  
equips your shop complete for this work.

**Price \$385.00**  
Payable \$50 per month  
Write for bulletin 975M

**WEIDENHOFF** 4350 ROOSEVELT ROAD  
CHICAGO, ILL., U. S. A.

## A JOHNSON No. 300 Melting Furnace

Will melt 150 lbs. of soft metal quicker, cheaper and less trouble to operate than any type Furnace. Does not require a forced air blast.

Installed instantly by connecting to city gas pressure and consumes only 40 cu. ft. of gas per hour. Complete with Melting Pot—

**\$25.00**

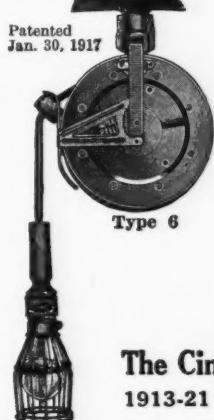
Write for catalog of Gas Appliances.

**JOHNSON GAS APPLIANCE CO.**  
Cedar Rapids, Iowa



No. 300

New York Office:  
277 La Fayette St.



Patented  
Jan. 30, 1917



Type 6

## Autex Extension Reel

Takes light where wanted. Cord locked at any desired point and rewound automatically on reel when not in use. Used in all places where extension of either light or power is required, eliminating the inconvenience and danger of loose cord extensions.

Approved by Underwriters

The Cincinnati Specialty Mfg. Co., Inc.,  
1913-21 Powers St., Cincinnati, Ohio

## Easier, now, to grind valves the better way—and faster too



**\$3.00**

The screw driver principle is conceded by the best motor engineers, designers and mechanics to be the most efficient method of grinding in a set of fine valves. With the Beardsley Hi-Speed Valve Grinder you can use long strokes for roughing the valves down and short strokes for finishing—all with a smooth and easy motion.

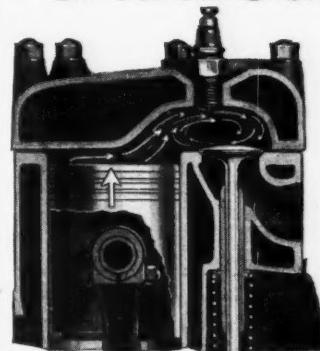
The Beardsley Hi-Speed Grinder fits all valves. It comes packed in individual cartons with long and short shaft, special Ford bit and adjustable bit.

Write today for the liberal discounts and full information and ask your jobber for the Beardsley Hi-Speed Valve Grinder.

The Loomis-Beardsley Co.,  
1200 South Wall, Columbus, Ohio

**BEARDSLEY HI-SPEED VALVE GRINDER**  
(Fiddle Type)

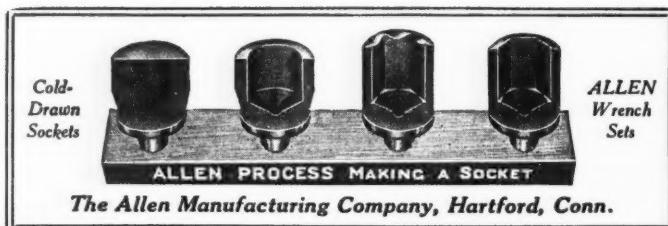
## The Ricardo Head



produces higher speeds and obtains economies so great that it compels broad recognition as a distinct development in the history of internal combustion engines.

All Waukesha Motors are now equipped with the Ricardo Head.

**WAUKESHA**  
Motor Company  
ENGINE BUILDERS  
Waukesha, Wisconsin  
New York Detroit



The new Columbia selling agreement incorporates those features interesting to successful dealers. You are invited to investigate.

**COLUMBIA MOTORS CO.**  
Address Dept. "B" Detroit, Mich.



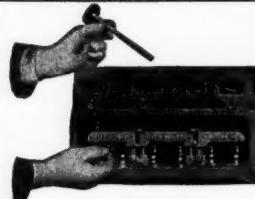
The 100% Lubricants  
Guaranteed not to cake or harden or to contain any Moisture, Mineral or Fatty Acids.  
Attractive proposition for Jobbers and Dealers.  
**RADIANT OIL CO., Inc.**  
Manufacturers and Compounders

Lima Ohio



### ALVORD QUALITY TOOLS

Taps, Dies, Cutters, Drills, Reamers  
Send for Catalog  
**ALVORD REAMER & TOOL COMPANY**  
Millersburg, Pa.



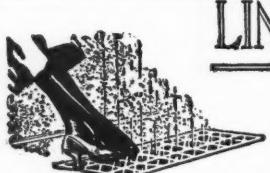
**SPEED-O**  
**Multiple Valve Lifter**  
LIFTS 8 TO 12 VALVE SPRINGS  
IN LESS THAN 30 SECONDS  
Manufactured by  
**SPEED-O MULTIPLE VALVE LIFTER CORP.**  
1926 Broadway, New York

### RAMCO

*Cushion*  
**INNER RINGS**

fit behind piston rings and keep them in perfect contact with the cylinder walls at any motor speed or temperature.

**RAMSEY ACCESSORIES MFG. CORP., ST. LOUIS, MO.**



### LINENDOLL EXHAUST HEATER

Attractive in appearance, with cleaning features of removable heating coil with no connecting joints inside the heater pan to leak. Meets instant approval. No odor or noise. Easily installed and operated. Will boost your winter sales—get our attractive trade proposition.

THE NORWALK AUTO PARTS CO.  
Norwalk, Ohio



### PYROLITE

**STOP SIGNALS**

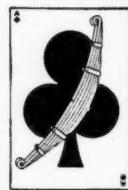
High in Quality—Low in Price  
Get Our Plan

Steinberg Products Co.  
3146 Olive St. St. Louis, Mo.

### BUTLER SPRINGS AND THE ACE OF CLUBS ALWAYS WIN

Butler Springs are made of very fine grade steel. They are carefully heat treated and tested for hardness and strength.  
Order your Ace of Springs today.

**BUTLER AUTOMOTIVE SERVICE CO.**  
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### REPAIRMEN

Here's a new source of profit!  
Send us your rewind jobs. We are "Armature Winding Specialists."

Profit for you in our service. Ford generator armature rewind—\$1.95. Other prices in proportion. All work guaranteed. Write for catalog and prices on all generators.

H. M. FREDERICKS CO., Lock Haven, Pa., U. S. A.



### "Best Money Maker I Ever Handled" Says One of our Distributors

And his sales prove it! The reason is that the Duplex Tire Carrier & Rim Tool is one of the most popular items of equipment introduced in recent years.

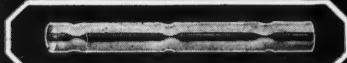
### DUPLEX

Second Spare Tire Carrier  
And Rim Tool  
Two tools for the price of one. Holds tires securely. Expands and contracts rims. Attached instantly. Write for details.

TRIPP-SECORD & CO.  
606 Kerr Bidg. Detroit, Mich.



"REQUIRES  
ONLY  
HEAT"



SAMPLE  
FREE

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**TESTBESTOS** REG.U.S. PAT.OFF. Automobile Brake Lining  
Manufactured by  
**AMERICAN ASBESTOS COMPANY**  
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### 140 Combinations —all in this ONE set

Everything you need, in one small box, compact, accessible, and a real mechanic's outfit. Sockets will not break. Fully guaranteed. Ask your dealer or write us.

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**Motorex** EQUIPMENT To Help You Sell ~ **Motorex**

WRITE FOR INFORMATION ABOUT  
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### Flower City Self Closing Chain Links

No tools required. Weight of car closes and locks. Repairs instantly.

Price, 10 links in box, 25c  
Write for prices, samples and discounts

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### The "WHITE" Valve Grinder—\$2.00 Retail

Repairmen say it does finest work. Has no complicated parts, delivers power exactly over the center and can be controlled perfectly. Reaches valves ordinarily inaccessible. Liberal discount. Ask your jobber.

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TIRES AND TUBES  
KOKOMO RUBBER CO., Kokomo, Indiana  
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Kokomo Long Life tires and tubes make money for dealers who handle them.

Kokomo Twin-Grip Fabrics

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### "2-Point-Test" \$2.50 HYDROMETER

"Guards Your Battery's Health"  
Here at last is a battery tester of very finest quality. It is absolutely guaranteed to be accurate—every instrument must pass the two-point test. Green ribs of celluloid make sticking of float impossible. Write for details.

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**PERFECTION**  
MOTOR CAR  
HEATERS

The Perfection Heater & Mfg. Co., Cleveland, O.



### HOESS

#### The Humanized Ring

Combines the simplicity of the one-piece ring with the snug fit and oil-scraping ability of more complicated designs. Good profit and fine results. Write for prices and discounts.

HOESS BROTHERS  
State & Jessie Hammond, Ind.



### Wood-Imes

Water Circulating Pump  
For Ford Cars and Trucks  
Is as reliable as the Ford Car itself and assures a positive cooling system that constantly functions. No more overheating—No more freezing in travel—Made engineeringly correct of best materials—quickly and easily installed. Write for Dealer Discounts and complete information.

WOOD-IMES MFG. CO., MINNEAPOLIS, MINN.

Formerly Mid-West Mfg. Co.

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Honeycomb and tubular replacement cores, Radiators and parts for all cars and trucks.

One-day service. Dealers find our agency profitable.  
Write for our plan

Rome-Turney Radiator Co.  
Service Dept., - - - Rome, N.Y.



### TYSON

#### Radiator Cover

Fits Core only.  
Best weather-proof  
materials. Ford  
size \$3. Average  
all other cars, \$4.  
Write for discounts.

TYSON MFG. CO., Lock Haven, Pa.

#### Stay-Tite Tire Cover

With handy hook.  
Hooks easily. Can't  
loosen. Top material  
or enamel drill. As  
shown and Drum Type.



The Auto Hone Co., Buffalo, N. Y.



### UNIVERSAL HOSE CLAMP

Adjustable. Two sizes will clamp any hose of any diameter. Made from cold rolled steel out of wire. No rough edges to cut hose. Put on in less than a minute. Everlastingly leak-proof. Order Universal Hose Clamps. Trademark on every clamp and carton. Get them from your jobber—or write us.

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**NaSee**  
CRANK PIN RE-RETURNING TOOL

**TOLEDO**  
Standardized  
**VALVES**  
Valves Exclusively for over 9 years  
THE TOLEDO STEEL PRODUCTS COMPANY • TOLEDO • OHIO

**THE STANDARD REPLACEMENT VALVE**

BUY EM BY THE SET!  
ask your Jobber

**BATTERY SERVICE EQUIPMENT!**  
**UNITRON** | **PORTOSTAT**  
Rectifier | Test Set  
FOREST ELECTRIC COMPANY  
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Spring-steel, Oil-tempered Bumpers in Six Complete Styles. Guaranteed Satisfactory Attaching Arms for all Leading Makes of Cars.  
We invite comparison in appearance, quality and price.  
THE BELLEVUE MANUFACTURING CO., Bellevue, Ohio



The Aristocrats of Motordom  
7 Models - Open and Closed Distributors in principal cities. Open territory now being closed.  
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We can prove to any automobile dealer that there's money in selling Vesta Batteries and there's no "grief." We say we can prove it. Ask us to do it.



BRAKE LININGS and CLUTCH FACINGS  
Always used where safety and service are the first and only consideration.

KELSO MFG CO.

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## THE QUINCY SILENT AIR-MASTER

*The Most Air Per Dollar Cost*

## WALL PUMP & COMPRESSOR CO.

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Wedge-Rite piston rings are 3-piece rings following the best engineering practice. The patented wedge takes up the wear, keeping the groove and cylinder wall tight against oil and compression leakage. Wedge-Rite Piston Rings are made from the best individual castings.

Wedge-Rite Plattsburgh, N. Y.



## FRONTENAC CYLINDER HEADS and FRONTY-FORDS

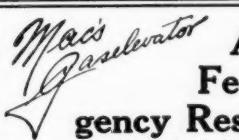
The remarkable showing of the Fronty-Ford in the 500-Mile Race at Indianapolis May 30 was due solely to the performance of the Frontenac Cylinder Head. This Head is adapted for use on your Ford car by its designer and builder, Arthur Chevrolet. Write for FREE Catalog, Book, "How to Build a Fronty-Ford," \$2.00; free with orders of \$50.00 or more.

CHEVROLET BROS. MFG. CO., 410 W. 10th St., INDIANAPOLIS

"The Best-Equipped Shop Gets the Business"



More Power Less Fuel  
Zenith - Detroit Corporation, Detroit, Mich.



A Vacuum Gas Feed and Emergency Reserve Combined.  
For Ford Cars and Trucks  
Mountain Accessory Co. Emporium, Penna.

\$7.50



## EATON AXLES

## C. & G. WHEEL PULLER

Pulls only on the hub. Does not touch brake drum or spokes. Can't strip threads. One puller with two ADAPTERS fit 24 cars. Other adapters as needed. The greatest little puller you ever saw. Write for prices and literature. Guaranteed for year. Satisfaction or money back.

C. & G. WHEEL PULLER CO., Wellsville, N. Y.

## Helmet Products

Stock the real quality line of signal lamps, parking lights, etc. Our fixtures are distinctly different. All made of rugged DURALIUM castings—beautiful, practical, made to last. Our Ad-Lite is a big feature. Write for details today.

WILLIAMSON-BEACH CO., 882 Park Ave., Baltimore, Md.

## Lycoming MOTORS

FINE FOURS AND EIGHTS-IN-LINE  
LYCOMING MOTORS CORP., WILLIAMSPORT, PA.



## Real High Tension Ignition for Ford Cars

Varley Transformers eliminate nearly all chronic ignition trouble. Save gas. Add power. Keep plugs clean. Stop misfiring. Save repairs. \$2.50 each. Write for full particulars.

The Autocoil Co., Jersey City, N. J.



## Lorentzen Headlight Kontrol

AN AUTOMOTIVE NECESSITY THAT SELLS

LORENTZEN HEADLIGHT KONTROL, INC.  
60 Grand St. New York City.



### THE TOLEDO WHEEL

100% efficient. Requires no key for locking. Rigid as a stationary wheel. Send at once for Sample Wheel. Examine it. Test it. Convince yourself of the easy profits to be made. It's a big seller in a big field.

THE TOLEDO MFG. CO.,  
Factories Bldg., Toledo, Ohio

**\$2.00**

### Life Timer for Fords

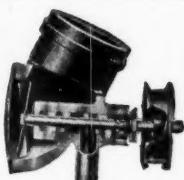
Needs no oil. Short proof. Fool proof. Wipes a perfect contact regardless of wobble in the shaft. Bakelite Commutator is reversible, giving 2 timers for the price of one. Sold through the jobber. Write for folder and discounts.

Mechanical Production Co.  
Milwaukee, Wis., U. S. A.

We Make  
**RADIATOR CORE EQUIPMENT**  
For the Complete Manufacture of  
**RADIATOR CORES**  
Ask Us About This Equipment  
*We make the best radiator test plug.*  
**RADIATOR ENGINEERING CO.**  
226 Nesslewood Ave. Toledo, Ohio

### CONNECTICUT IGNITION

Over 100,000,000  
**TIMKEN**  
Tapered  
**ROLLER BEARINGS**  
Have Been Manufactured



**WATER PUMP FOR FORDS**  
POSITIVE WATER CIRCULATION  
Keep them cool in Summer—  
A Winter Necessity  
**"CIRQUEX"**  
The only pump that seals water from bearing.  
Pumps 12 gallons water per minute at 18 M.P.H.  
Price—complete with belt—\$3.90  
PRICE BROS., FREDERICK, MD.

**Battery Plates**  
CONTINENTAL BATTERY CO.,  
3201 Papin St., St. Louis, Mo.

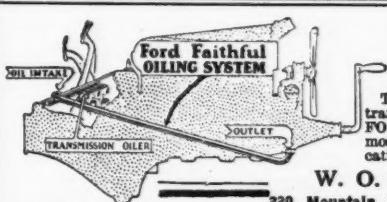
**GARDNER**  
Motor Car



### Bosch

The genuine, original Bosch Products always Stay Sold.

Robert Bosch Magneto Co., Inc.  
The Genuine, Original Bosch  
Otto Haina, Pres., 109 West 6th St., New York



### SAVES REPAIR BILLS

The recent addition of a special transmission oiling unit makes the FORD FAITHFUL Oiling System a most efficient eliminator of all lubricating troubles. Dealers Write

W. O. Thompson Mfg. Co.  
330 Mountain View St.  
Pasadena, Cal.



### Noiseless Timing Gears

Install quietness—Cloyes NOISELESS Timing Gears. They give the motor a soft, even "purr"—permanently.

Cloyes Gear Works  
1614 Collamer Ave., Cleveland, O.  
Sales Representatives  
United Autoware Co., Fisk Bldg., New York City  
N. Lowenthal, Box 952, Ft. Worth, Texas

### WEL-EVER OIL CONTROL PISTON RINGS

Write for interesting circular on oil pumping and selling piston ring.

THE WELEVER PISTON RING CO.  
1713-15 Canton St.  
Toledo, Ohio



For information about the  
Durant and Star Car selling  
franchises write

DURANT MOTORS, Inc.

560 Jackson Avenue,  
Long Island City, N. Y.



**PETERSEN**  
*Guaranteed* HALF INCH  
ELECTRIC DRILL

So powerful that the combined strength of three men could not "stall" it when drilling  $\frac{1}{4}$ " holes in steel.  
Write for miniature catalog describing the complete line of Petersen Portable Electric Tools.

A. H. PETERSEN MFG. CO., 1616-24 Fratney, MILWAUKEE

**HYMAN**  
PRESSSED  
**BODIES**  
THE HYMAN PRESSSED BODY CO.,

YOU can handle this body PROFITABLY

All steel construction provides lightweight with extreme strength. Outlast chassis. One design fills most light truck user's requirements. Ton and Half-ton sizes. Shipped knocked down. Low priced. Distributor and dealer terms liberal. Write.

Huntington, W. Va.

**Stevens SPEED UP Tools**  
OVER 100 ACCURATE SHORT-CUTS  
TO GOOD WILL AND PROFIT ~ ~  
Ask for Shop Catalog "Thru your jobber—his service is economy"  
STEVENS & COMPANY  
375 BROADWAY • NEW YORK

## FEDERAL BUMPERS



Beauty and ruggedness combined—made in two styles:—the *Metropolitan* with one piece pressed steel front; and the *Broadway* double spring bar model.

Catalog No. 11 mailed on request

**FEDERAL PRESSED STEEL CO.**

Jobbing Division—London Guarantee & Accident Bldg., Chicago

## GAYLORD LITTLE GIANT Water Saver



Cuts your water bills in half by stopping water waste. Screws on end of hose. Gripping the nozzle starts the flow. When nozzle is released, the water stops AUTOMATICALLY. Self-operating. Impossible to get out of order. Made of brass; hose nozzle of pure rubber. List price \$3.00.

**THE GAYLORD MFG. CO.** Paterson, N. J.

*Rie Nie*

Resists the action of hot and cold water, anti-freeze solution and oil.  
One of the well known Rie Nie Products. Manufactured by

**DURKEE-ATWOOD**  
MINNEAPOLIS, U.S.A.

## RADIATOR HOSE



**Goodrich**  
AUTOMOTIVE EQUIPMENT  
**Cable**  
Starting, Lighting, Braking  
Formerly M.B.

**THE GOODRICH-LENHART MFG. CO.**, Hamburg, Pa.

Goodrich Cable is sold in lengths found to be the most popular with the average buyer—coils of 100 ft. packed in individual cartons. Both shop men and car owners like the clean 100 ft. package idea—and this leads to quick and profitable sales. Send for samples, prices and discounts.

## FISK TIRES

*There's a Fisk Tire of extra value in every size, for car, truck or speed wagon*



### Take a Tip From Buick

AFTER testing for 8 months under actual service, Buick engineers have recommended the HALL CYLINDER HONE for use in all their branches.

Your jobber will supply you.

The Hall Cylinder Hone Company  
435 Dorr St., Toledo, Ohio

## FOR SALE

SPECIALTY AUTO JACK for Ford and light cars, with many unique and attractive selling features, including patents, tools, dies and equipment complete for manufacture. Some good business and distributing connections already established. Would make a splendid addition to accessory line already on sustaining basis. For full particulars, address MANUFACTURER, Box 6132, care MOTOR AGE, 5 S. Wabash Ave., Chicago, Ill.

**LITTLE WONDER**  
VALVE SPRING COMPRESSOR

The most efficient Valve Spring Compressor and Holder. Saves time and temper. Fully guaranteed. Printed matter on request. Get it! \$7.25 C. O. D.

The Little Wonder Valve Tool Co.  
606 Oneida St., Joliet, Ill. P. O. Box 1028  
Manufactured by Waterloo Valve Spring Compressor Co.

**LINCOLN**  
FOR ALL CARS—\$15 to \$36  
**SHOCK ABSORBERS**

## Racing FORDS

Write today for pamphlets and LOW PRICES covering Power-Plus Cylinder Head. Aluminite Racing Pistons and Connecting-Rods, High-Speed Camshafts. Rebuilding ALL MAKES of cars for racing a specialty. Nine years' experience.

**GREEN ENGINEERING CO.**, Dayton, O.

**free**  
write for  
your copy

### The Book "AIR PROFITS"

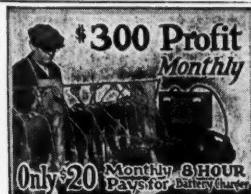
Shows how to get more work out of an air compressor. How to use compressed air for many pay jobs.

**BRUNNER MFG. CO.** UTICA NEW YORK

**BRUNNER**  
AIR COMPRESSORS

Now offering both the matchless Peerless Eight and the Superb Peerless Six

## PEERLESS



### Make Big Money Charging Batteries

Small cash payment brings you HB 8 Hour charging outfit. Easy terms of only \$20 monthly let your profits pay balance with nice surplus besides. Thirty day free trial on money back guarantee lets you try HB outfit at our risk. You can easily make \$150 to \$300 monthly. Start now to make big profits with HB 8 Hour battery charger. Write today for Bulletin 321.

Hobart Bros. Co. Box AR624, Troy, O.

## CABLES of Quality

**The Packard**

**Electric Company**

Standard since the beginning  
of the industry.

**WARREN,  
OHIO**

### Have you seen the new Gilmer Fan Belt?

It's a V shaped belt, constructed of tough fabric and a new special rubber compound. Sizes for all popular cars using V or grooved pulleys. Write for prices and complete information.



L. H. Gilmer Co.  
Philadelphia  
"It's a Gilmer Product—you  
can depend on it." —Happy  
Van, the Gilmer man.

**Gilmer**



# The SPOTLIGHT

DEPARTMENT

WILL FIND WHAT YOU WANT



## PARTS and REPAIRS

### WRITE US FIRST!

#### Save Time and Money

We carry a complete line of Automobile Parts  
Transmissions (all kinds)  
Cylinder Blocks Magneto's (all kinds)  
Drive Shafts Carburetors  
New Gears (all kinds) Starters  
Used Gears (all kinds) Rear Ends  
400 Motors of all kinds in stock at all times

#### WRITE

### BENNETT BROS.

Largest Auto Wreckers in the Country  
Grant and Water Sts. Pittsburgh, Pa.  
Mail Orders Given Prompt Attention

### WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER Kansas

### AUTO INDUSTRY MAILING LISTS

Send to headquarters for dependable lists of Automobile Owners, Dealers, Accessories, Garages, Tire and Battery Stations, Truck Fleet Owners, Bus Lines, Taxicab Companies. Write for catalog and prices.

MOTOR LIST COMPANY  
403 Grand Ave. 225 Polk Directory Bldg.  
Des Moines, Iowa Detroit, Mich.

### PARTS FOR ALL MAKES OF CARS

Immediate service is our motto. Out of town orders shipped the same day they reach us. Full supply of all parts for all cars ever made. Complete line of new and used accessories. Satisfaction guaranteed. Send deposit with order, and specify clearly name, year and model of car. Send part if possible.

TRIO AUTO-PARTS & TIRE CO.  
2118-2120 S. Wabash Ave. Chicago, Illinois  
2012-2014 S. State St.

### NEW AND USED AUTO PARTS

We have wrecked over a thousand cars.

SANDER BROS. AUTO WRECKING CO.  
WEST POINT, IOWA

### COMPLETE STOCK

New and Used Auto Parts, Accessories and Supplies, for all make and models of cars.

CADILLAC "57" MOTOR COMPLETE or any part of same.

FENDERS for all Cadillac models.

MERCER MOTOR COMPLETE with U. S. L. Starter.

FOHRMAN BROS. AUTO PARTS COMPANY  
2344 South State St., Chicago, Ill.

### JANSEN FLY WHEEL GEAR RINGS

Chevrolet 490.....\$3.00  
Chalmers ..... 4.00

JANSEN MACHINE COMPANY  
Des Moines, Iowa

### AUTO Save 50 — 90% PARTS

2000 Models  
NEW AND USED GEARS, AXLES, BEARINGS,  
SPRINGS, MAGNETOS, GENERATORS, ETC. JOBS  
BERS IN BANKRUPT AUTO SUPPLIES.

BRIGHTMAN AUTO EXCHANGE  
321 Windsor Ave. HARTFORD, CONN.

## INFORMATION

**Six cents a word** is the rate for all undisplaced advertisements set solid, regular want ad style; all capitals, 9c. a word; all capitals leaded, 12c. a word; minimum charge \$1 an insertion; payable in advance (see next paragraph).

**Ten per cent discount** if one payment is made in advance for four or more consecutive insertions. Advertisements other than "Positions Wanted" will be billed monthly if run more than four times.

**Add five words** for address if replies are to come to a box number address at any of our offices. These replies are forwarded each day as received, in new envelopes, at no extra charge.

**Refund will be made** if all insertions ordered are not needed, the amount refunded being the difference between cost of insertions given and full amount paid.

**Telephone orders** must be confirmed in writing same day. No allowances can be made for errors of any kind unless prompt notification is sent us.

**When replying** to blind ads be careful to put on your envelope the correct box number and do not enclose original letters of recommendation—send copies.

**Displayed advertisements** are sold by the inch. Rates will be furnished upon application.

**The right is reserved** to refuse any advertisement and also to rewrite and edit copy furnished whenever the publishers consider it advisable to do this.

SPOTLIGHT DEPARTMENT  
THE CLASS JOURNAL COMPANY  
239 W. 39th St., New York  
5 S. Wabash Ave., Chicago

## PARTS and REPAIRS

### DOWMETAL PISTONS

Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.

#### SEND FOR PARTICULARS

LAMMERT & MANN CO.  
Cylinder and Crankshaft Grinding  
215-21 N. Wood St. CHICAGO Phones West 4918

## AUTO PARTS

### SAVE 50% TO 75% ON ALL CARS

New and Used Gears—Springs and Axles—Cylinders—Motors—Rear Systems, etc. Wire or Write

INDIANA AUTO PARTS CO.  
316-18 NO. ILLINOIS ST., INDIANAPOLIS, IND.  
LARGEST CAR WRECKERS IN INDIANA

ANY PART Send for Catalogue  
for ANY CAR NEW or USED  
Send for Catalogue  
Cincinnati Auto Parts & Wrecking Co.  
712-714 Walnut St.  
CINCINNATI, OHIO  
Parts our middle name

PARTS FOR AUTOS AND TRUCKS  
WHAT DO YOU NEED? We have it. Gray's Auto Parts Company, 3212 Brighton Road, Pittsburgh, Pa.

## PATENTS and PATENT ATTORNEYS

Attorney-at-Law and Solicitor of Patents  
C. L. PARKER

Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.

McGill Building, WASHINGTON, D. C.

## PATENTS and PATENT ATTORNEYS

# PATENTS

BOOKLET FREE HIGHEST REFERENCES

PROMPTNESS ASSURED BEST RESULTS

Send drawing or model for examination

and report as to patentability

WATSON E. COLEMAN, Patent Lawyer

644 G Street, N. W., Washington, D. C.

## MISCELLANEOUS

### IMPORTED ACCESSORIES

Mileage Recorders for Fords and Trucks.  
8-Day Clocks for Motor Cars.

Miniature Automobiles.

J. A. WURTHNER & CO.  
Schwenningen am Neckar, Germany

FOR SALE—Basic Patent. Efficient, three-way movement, controllable automobile head light device, suitable for all standard automobiles. Makes night driving safe and satisfactory. Always clear vision of roadway, without blinding on-coming driver. F. G. GAUNTT, Fort Wayne, Indiana.

### WE BUY OLD PLATINUM POINTS

In any condition and any quantity. Full value paid. Send them to us, we will mail check or money order at once. N. Uhler Company, 117 N. Dearborn St., Chicago, Ill.

FOR SALE—General machine and cylinder grinding shop. In town of thirteen thousand population, no other cylinder grinding shop within thirty miles. Best equipped to handle automotive work in this section. Address Box 6131, care MOTOR AGE, 5 S. Wabash Ave., Chicago, Ill.

REPAIRMEN—Earn big money. Start an automobile service station. Renovate old used cars. Make auto supplies, etc. We teach you this business completely, at home. Demand practically unlimited. Autorenewers MA, Sheboygan, Wis.

FOR SALE—WELL ESTABLISHED GARAGE BUSINESS INCLUDING good stock of Tires, Oils and Accessories. Good repair shop equipment, including battery repair tools. Address Box 6134, care MOTOR AGE, 5 S. Wabash Ave., Chicago, Ill.

Tool equipment for sale. Going out of business. Includes 15 inch lathe, Welding outfit, Blacksmith tools, Modern repair shop equipment. The Central Garage, Wheaton, Ill.

FOR SALE—Garage in Southwest Oklahoma well equipped repair shop. Good stock Ford parts and accessories. Five gallon Bowser Gasoline pump. Olustee Garage, Olustee, Okla.

FOR SALE—Authorized electric service station and garage in a city in Connecticut. Will sell at inventory on account of health. Address Box 6124, care MOTOR AGE, 5 So. Wabash Ave., Chicago, Ill.

## HELP WANTED

SALESMAN WANTED—Prominent manufacturer of rubber automobile accessories has an opening in Central States for salesman. Product sold to jobbers only; excellent opportunity but results insisted upon. Give age, education, experience, salary expected and all details of interest in first letter. Address Box 6133, care MOTOR AGE, 5 S. Wabash Ave., Chicago, Ill.

## SITUATIONS WANTED

WANTED—Connection by single man, twenty-nine. Experienced automobile and general merchandise manager. Prefer territory representative for automobile manufacturer. Would accept foreign employment. Best of references. Address Box 6128, care of MOTOR AGE, 5 So. Wabash Ave., Chicago, Ill.

SITUATION WANTED—By an expert automobile man. Machinist by trade. Can manage Service or Repair Department. Address Box 6135, care MOTOR AGE, 5 S. Wabash Ave., Chicago, Illinois.

Some other reader wants to buy what you want to sell—let

**Spotlight Service**

find him for you

The Tool That Conquered All

Another World's Record Shattered for Changing Tires

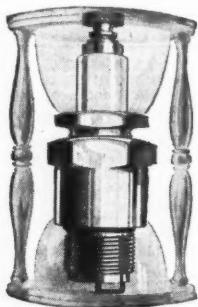
NOT satisfied with his former world's record for tire changing, J. A. Kennedy made a new speed record of 2 minutes 36 $\frac{1}{2}$  seconds for the complete change of six rims. As usual, he used the Pacific Rim Tool.

This tool is not only famous for "speed ability" but for simplicity, strength and safety of operation.

PRICE \$10.00

**Pacific Rim Tool Co.**  
16606 Waterloo Rd. 2339 11th Av. N.  
Cleveland, Ohio Seattle, Wash.  
Export Office  
1834 Broadway New York City

You Can Break Your Own Speed Record with the  
**PACIFIC RIM TOOL**



*The Life of a Spark Plug is as Long as the Insulator*

You'll have to admit that a spark plug has a rather tough life of it. The first thing that fails is the insulator and then it's "good-bye spark plug." It's therefore quite necessary to see that the insulators in the spark plugs you buy are the best. Spark plug manufacturers say "775" insulators are the best. They back their statement by using "775" in their spark plugs. If you want to use spark plugs which resist heat better and cost no more, look for "775" on their porcelains.

"775"

**FRENCHTOWN PORCELAIN CO.**  
Trenton, New Jersey

"Established 1910—  
Busy Ever Since"

**STANDS THE TEST**

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Williamson-Beach Co.	140
Wood-Imes Mfg. Co.	139
Zenith-Detroit Corp.	140

## Now try a little cake!

Snap-ons are the sweetest sellers in any dealer's store. They move fast and stay moved—all a Snap-on customer comes back for is more Snap-ons. You can sell a handle and socket and build from there, or sell a complete kit, specially selected for any individual make of car. Ask us how.

**MOTOR TOOL SPECIALTY CO.**

14 E. Jackson Blvd., Chicago

**SNAP-ON WRENCH CO., MFRS.**

Milwaukee, Wis.

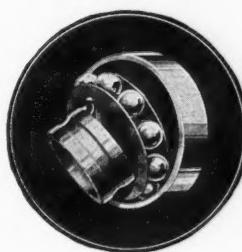
# Snap-on

INTERCHANGEABLE  
Socket Wrenches

"**NORMA**"

PRECISION  
BALL BEARINGS

OPEN TYPE



CLOSED TYPE



Service records prove that magneto and lighting generators with "**NORMA**" Precision Ball Bearings, run more quietly, last longer.

**THE NORMA COMPANY  
OF AMERICA**

Anable Avenue

Long Island City New York

BALL, ROLLER AND THRUST BEARINGS

# 85.6%

of all Stutz cars built since the Stutz Motor Car Company of America, Inc., was founded in 1911, are in use today.

**Dealer service on Stutz cars during 1923 was less than \$6.00 per car [national average].**

**Retail sales of Stutz cars for 1923 were more than 3 times as great as for the year previous.**

**Retail sales of Stutz cars for January and February, 1924, were more than 50% greater than for the same two months of 1923.**

**The Stutz Company now offers a complete line of fourteen enclosed and open models on three exclusive chassis ranging in price from \$1995 to \$3785 [f. o. b. factory].**

**There are no quotas; no forced shipments; no overloading. Prices are right; discounts are right; and factory co-operation of the kind that the dealer can count on—always.**

**If you have not investigated the Stutz franchise, do so.**

**It is one with which you can make money on a limited volume of business—without being crowded or pushed.**

**Write or wire for particulars.**

**STUTZ MOTOR CAR COMPANY  
of AMERICA, Inc.**

*Builders of the Original and Genuine Stutz Motor Cars*

**Indianapolis, Indiana**



**The Sign of  
the Genuine**

# BLACK & DECKER ELECTRIC BENCH GRINDER

Price \$38

IN CANADA \$50



(Complete with two Grinding Wheels, 6 inches in diameter by  $\frac{1}{2}$ -inch face.)

## A SIX INCH ELECTRIC BENCH GRINDER DESIGNED PARTICULARLY FOR AUTOMOTIVE SERVICE REQUIREMENTS.

Unusually powerful, but light in weight. Need not be fastened to bench as the rubber feet hold it from moving under grinding pressure. This feature together with carrying handle makes it easy to move from one place to another as required.

Practically vibrationless (a lead pencil can be balanced on the grinder while it is running). The smooth operation insures long life.

A husky, reliable machine tool which lives up to BLACK & DECKER STANDARDS in every way, at a price very little more than you would pay for an ordinary grinder. You can secure it from your own jobber without delay.

Write for new Black & Decker Miniature Catalogue of Electric Tools.

**THE BLACK & DECKER MFG. CO.**  
TOWSON, MD.

Branch Offices with Service Stations located in the following cities

BOSTON  
NEW YORK  
PHILADELPHIA

DETROIT  
CLEVELAND  
ATLANTA

CHICAGO  
KANSAS CITY  
SAN FRANCISCO

Canadian Factory, Lyman Tube Building, Montreal, P. Q. "The Best-Equipped Shop Gets the Business"





## ALL OWNERS— ALL SALESMEN!

HERE'S a remarkable picture—eighteen owner-driven Chandlers snapped on the way up Fort George Hill, New York City, in high gear! Seven more had passed when the camera clicked.

Our New York distributor wanted to show vividly that the city's hardest climb held no terrors for the national stock car performance champion. He invited twenty-five owners to participate in a demonstration. All responded. From a standing start in high gear, all negotiated the climb with ease.

The picture is remarkable, not so much because it shows a number of Chandlers conquering a difficult hill, but because it gives photographic evi-

dence of how Chandler owners actively co-operate with Chandler dealers.

Such co-operation is immeasurably valuable. Dealers handling some lines get little such help. Chandler dealers get a lot—because the Chandler is a car that any man is proud to "show off."

With the Pikes Peak Motor and the Traffic Transmission he can do things that are impossible with any other car. And you cannot blame a man for being willing to go out and put such a car through its paces.

If you don't know all about the Chandler franchise and the 1924 Chandler with its numerous exclusive and outstanding features, drop us a line.

(The Traffic Transmission is built complete in the Chandler plant under Campbell patents)

THE CHANDLER MOTOR CAR COMPANY  
Export Dept., 1819 Broadway, New York City

CLEVELAND  
Cable Address: "CHANMOTOR"

# CHANDLER

THE CAR OF THE YEAR